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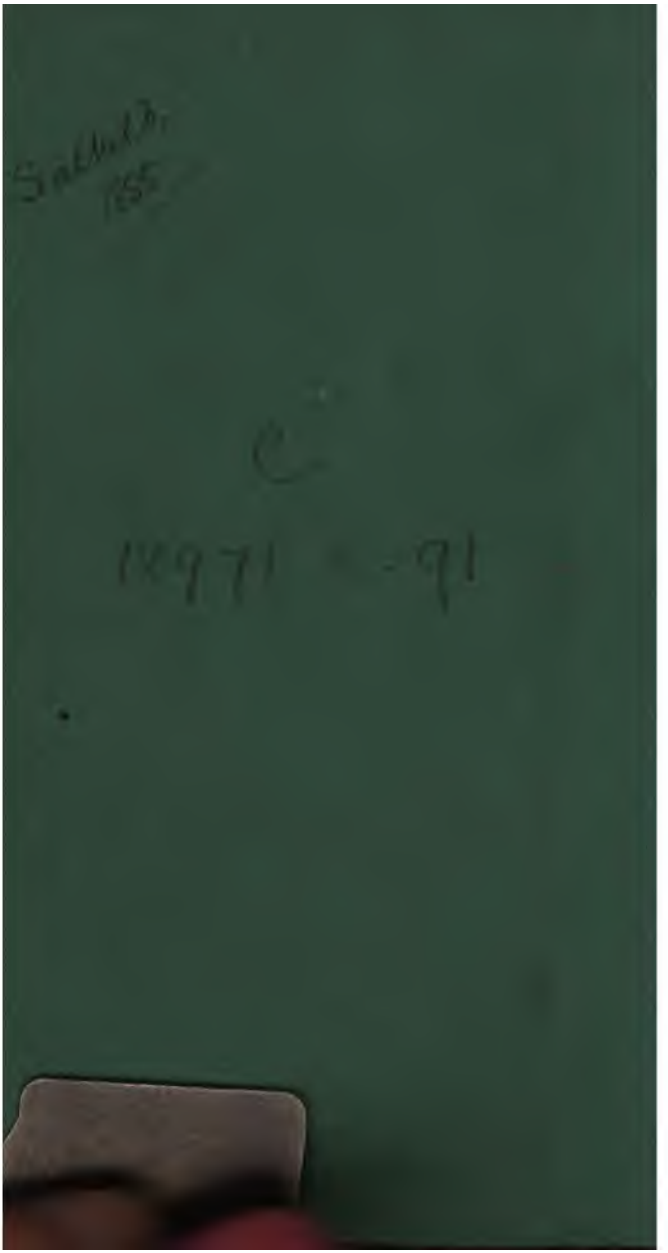

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NATURAL HISTORY

OF THE

RUMINATING ANIMALS,

CONTAINING

GOATS, SHEEP, WILD AND DOMESTIC CATTLE, &c.

ILLUSTRATED BY THIRTY-THREE PLATES; WITH MEMOIR AND PORTRAIT OF JOHN HUNTER.

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ADVERTISEMENT.

In a work such as the Naturalist's Library professes to be, it is not requisite to give a particular preface to every separate volume; but when we have any notice of our future operations of an interesting nature to communicate to our readers, any accession of strength to our list of learned contributors, or any new discoveries in Zoology to lay before the public, we have much pleasure in doing so in the way of a simple advertisement.

We are happy therefore to have now to mention, that it will very soon be our delight to bring out, as a portion of the work, the first of a few volumes by Mr Swainson, who is well known to be one of the best zoologists of this or any other country, and whose comprehensive and philosophic views of the science of Natural History have for a long time rendered any contribution from him equally interesting to the naturalist and to the ordinary reader.

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The Natural History of Parrots, by Mr SELBY of Twizell, author of the British Ornithology, will now in a very short time be published. The whole drawings for its illustrations are from the pencil of Mr LEAR, and from their variety of form, beautiful plumage, and curious manners, the volume cannot fail of proving very acceptable.

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consider the illustrations or the accounts given of them, this will turn out to be not the least interesting of our publications.

We are glad to have it in our power to announce, that the demand for our volumes continues undiminished, and enables us, by that means alone, to select and employ gentlemen of the very highest talent as our assistants in this publication, which is now pretty well known, and anxiously asked after over this kingdom, as well as America, and many places on the Continent of Europe, facts which we mention here, altogether with a view of assuring our readers of the prospect of the uninterrupted continuance of the series, arising from the encouragement with which the work is everywhere hailed.

We have to offer our best acknowledgments to Robert Brown, Esq. Chamberlain to his Grace the Duke of Hamilton, for having procured for us the very interesting account of the White Urus of Cadzow Park, Plate XXIV.

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In all Thirty-three Plates in this Volume.

MEMOIR OF JOHN HUNTER.

THE subject of the following memoir, though universally ranked among the most illustrious individuals whose names adorn the close of the last century, has perhaps been chiefly known by his proficiency in anatomy and surgery. That he is fully entitled to the highest celebrity in both these departments, it is impossible to dispute; but we may, at the same time, confidently affirm, that, could his own voice have been heard, he never would have consented to rest his fame on any narrower basis than that afforded by his indefatigable labours, and his brilliant achievements in the wide field of natural science.

It is not difficult to account for the partial notions often entertained respecting Mr Hunter's scientific character. It was as an anatomist he began his bright career; and, long before its close, he had acquired a popularity as a surgeon which had never before been equalled, and has never since been surpassed. The study of anatomy and physiology,

however, only served to conduct his inquiring mind into the boundless regions of Nature's wonders, to the examination of which he devoted himself with undeviating enthusiasm; so that every thing that lived, from man himself, down to the blade on which he treads, and the insect which it nourishes, became in its turn the subject of his penetrating scrutiny. Human speedily led to comparative anatomy, and this latter merged in the study of all animated nature. Mr Hunter, however, was not born to an independent fortune; and the entanglements and responsibilities of his profession necessarily encroached upon his scientific labours. Nevertheless, even his profession was made subservient to the aspirings of his genius; and out of its honourable gains, he proceeded gradually to rear his own most lasting monument, in a Museum, which, though known to the public only in connection with a professional body (the London Royal College of Surgeons), has yet realized the splendid design of its founder, by forming, in no small measure, a concentration of the natural history of the world.

Another circumstance, which has materially contributed to stamp Mr Hunter's celebrity with that limited and professional character to which we have alluded, is, that his life has been written only by his professional brethren,—men who naturally considered it their main object to supply that species of information which would be most highly valued by that learned body of which Mr Hunter formed so

distinguished an ornament. One of these biographies proceeded from the pen of a near relation, the late Sir Everard Home;—another is written by an individual whose chief celebrity appears to have arisen from his being the opponent, and, to the extent of his ability, the persecutor of Mr Hunter;—the third is the production of a pupil and friend, Dr Joseph Adams, a name well known in the annals of medicine. From these sources we have drawn liberally in the following pages; but, at the same time, we must be allowed to add, that the life of John Hunter is still a decided desideratum. In what follows, we have endeavoured to reduce the merely professional features of his character to their just proportions; and we trust that the following sketch will be found by the naturalist to be at once interesting and instructive.

We shall only further observe, that the portrait at the commencement of this volume, is a faithful copy of Sharp's celebrated and now scarce engraving of Sir Joshua Reynolds' picture. It is recorded, that when these lineaments of Mr Hunter's interesting countenance were shown to Lavater, he observed, "That man thinks for himself,"—a remark of the justness of which the following pages will afford abundant evidence.

John Hunter was the son of John and Agnes Hunter of Kilbride (Easter), in the county of Lanark. His father was descended from Hunter of Hunterston, an old family in Ayrshire, and his mo-

ther was a daughter of Mr Paul, a respectable citizen of Glasgow, and treasurer of the burgh.

He was born at Long Calderwood, a small estate belonging to the family, on the 13th–14th February 1728. Sir E. Home states his birth, by mistake, on the 14th *July*. But the parish-register bears the 13th February, and on the 14th of that month, the Royal College of Surgeons of London celebrates the anniversary of the birth of this distinguished individual.

John was the youngest of ten children, five of whom died in infancy. James, the eldest of the brothers who attained to manhood, was born in 1715. After prosecuting the legal profession in Edinburgh for some time, he, in the year 1742, visited his brother William, then a teacher of anatomy in London; and so much was he captivated by this pursuit, that he resolved to abandon his profession, and devote himself to medicine. His success promised to rival that of either of his brothers; but his health unfortunately gave way, and he died of a pulmonary complaint in the 28th year of his age.

The next brother, William, born in 1718, early rose to unrivalled distinction as a teacher of anatomy in London, attained a professional reputation which could not be exceeded, and a celebrity second only to that of his brother John. By unwearied industry, and at vast expense, he formed the museum which immortalizes his name, and which, by his liberality, now enriches the University of Glas-

gow. It was under the fostering care of this elder brother that John was initiated into those pursuits in which he soon became the rival of his instructor.

Of the daughters of the family, Janet married Mr Buchanan of Glasgow, of whom more presently; and the younger married Dr James Baillie, Professor of Divinity in the University of Glasgow, from whom descended the illustrious Dr Matthew Baillie, and the not less distinguished Mrs Joanna Baillie.

The subject of this memoir was born when his father had nearly reached his 70th year. Hence we cannot be surprised to learn, that he at no time received the benefit of paternal restraint. At the age of ten, he lost his father, and was then left under the sole direction of his mother, who proved too indulgent to her youngest child. At the parish school, his studies were neglected, and the greater part of his time was spent in amusements. His early education was thus extremely imperfect; and hence arose many deficiencies, distinct proofs of which, most painful to himself, were not wanting in his subsequent history.

When he had attained the age of seventeen, a period at which it was high time to engage in some regular employment, he went to Glasgow on a visit to his brother-in-law Mr Buchanan. The object of this visit has been variously represented. Mr Buchanan had lately returned from London, to settle in Glasgow as a cabinet-maker and carpenter. He was a man possessed of many agreeable qualities, and having

won the heart of Miss J. Hunter, she, contrary to the wishes and advice of her relations, consented to become his wife. The marriage proved unfortunate. Buchanan got into company, and neglected his business, which of course became involved. According to one representation, Mr Hunter removed in these circumstances to Glasgow, to comfort his sister, and to assist in extricating her husband's affairs; but, according to another account, his object was to associate himself in the business, and prosecute the trade. It is obvious, however, that these two objects are in no way incompatible; and it would be false shame to throw a veil over the transaction. If probabilities and local tradition may be depended upon, there appears little doubt that John worked at his brother-in-law's trade for some time; but matters do not seem to have benefited by his interference, and eventually he returned to Long-Calderwood.

How far John Hunter was chagrined by this failure, or what influence it may have had on his future character, we have no means of determining. Up to this period, however, it is apparent, that his powerful mind had found nothing to arouse its energies. The drudgery of grammar, and of a mechanical trade, had proved alike uncongenial; and, though wayward in his temper, and too little schooled by discipline or art, it is not to be doubted that his active mind was spontaneously exercised in some manner which tended to strengthen its faculties, and enabled him to maintain through life an individuality

of character, and an independency of thought, which have rarely been surpassed.

Having returned home in the summer of 1748, and finding nothing there upon which to employ his energies, John Hunter addressed himself to his brother William, requesting permission to visit him in London, and making an offer, at the same time, to assist him in his anatomical employments. In answer to his letter, he received a very kind invitation from his brother, and immediately joined him.

Mr Hunter arrived in London in the month of September, about a fortnight before the commencement of his brother's course of lectures. Dr Hunter immediately introduced him into the dissecting-room, where his first essays were so promising, that Dr Hunter did not hesitate to pronounce that his brother would make a good anatomist, and that he should not want employment. Under the instructions of Dr Hunter, and his assistant Mr Symonds, he now enjoyed every opportunity of improvement, all the practical anatomy at this time carried on in London being confined to this single school.

In the following summer, the celebrated Cheselden, at the request of Dr Hunter, permitted John to attend Chelsea Hospital; and here he was initiated into the first rudiments of surgery.

In the succeeding winter, Mr Hunter was so far advanced as to become Demonstrator of Anatomy, assisting and directing the pupils in the dissecting-rooms, while his brother confined his attention al-

most entirely to the regular lectures in the class-room. The assiduous discharge of the most laborious duties of this situation, gave him full employment during the winter 1749–50.

During the summer, Mr Hunter resumed his attendance at the hospital at Chelsea; and in 1751, he became a pupil at St Bartholomew's Hospital, of which Mr Pott was then the distinguished ornament. During the winter months, his more pressing avocations must have confined him in a great measure to his brother's premises, though he always endeavoured to be present at the hospital when any thing occurred of more than ordinary interest.

In 1753, he entered gentleman commoner at St Margaret's Hall, Oxford, for what specific object does not very clearly appear. We do not learn that he passed any of his time at the University: and the constant routine of his London employments was not for a moment interrupted.

In 1754 he became surgeon's pupil at St George's Hospital, where he attended during the summer; and two years later, he discharged the duties of house-surgeon for a period of five months.

In the year 1755, after John had acted as his assistant for five years, Dr Hunter admitted him into a partnership in his lectures. A certain portion of the course was allotted to him, and he was expected to supply the Doctor's place, when professional engagements prevented his personal attendance. This proved a most irksome task to John. Anatomical

lectures, to be rendered interesting, must be delivered extempore—a style of lecturing in which Dr Hunter had attained the highest possible excellence; but, unfortunately few men were less qualified than John to be placed in competition with his brother, in this exercise of talent.

Making anatomical preparations were at this time a new art, and very little understood. Every skilful preparation, therefore, became an object of admiration; and as many of them were required for the use of the lectures, and Dr Hunter had himself an enthusiasm for the art, he left no means untried to infuse into his brother a love for his favourite pursuit. How well he succeeded, the collection afterwards made by Mr Hunter will sufficiently evince.

We thus, at length, find Mr Hunter placed in a situation which was in every respect adapted to his talents and his tastes, and where he was surrounded with every advantage calculated to stimulate and direct the application of his energies.

The late Sir Everard Home remarks, that anatomy seems to have been a pursuit for which Mr Hunter's mind was peculiarly fitted; and he applied to it with a perseverance of which there is hardly any example. He laboured for ten years in this branch of science, during which period he not only became acquainted with what was already known, but made considerable additions to that knowledge. Some of his discoveries called forth the highest

commendations of Baron Haller, then considered the first physiologist in Europe, and still command admiration to the present day.

It would be out of place to enter into details of these anatomical and purely professional investigations. They were regularly expounded in the lectures of Dr William Hunter for a succession of years, and some of them were published in his Medical Commentaries. Further information regarding them may be found in Dr Simmon's Life of Dr Hunter, to which we refer those who are interested in such subjects. The same observation applies to Mr Hunter's labours in the department of surgery, which, though of the highest merit, are of such a nature as to preclude their being introduced to the notice of any but the professional reader. As we have already hinted, however, Mr Hunter's labours were not confined to professional investigations. He soon discovered that human anatomy presented too narrow a field for his ardent research. Many parts of the human frame being so complex that their structure and uses had hitherto baffled inquiry, he was led to examine similar parts in other animals, where the structure was more simple, and more within the reach of observation. Hence he was conducted not only to comparative anatomy, but to the whole science of zoology, which thenceforward became the favourite pursuit of his life. Even at this early stage of his career, we find him laying the foundation of that Museum of Comparative Anato-

my, the progress of which was altogether unexampled, and the labours connected with which justly place his scientific even above his professional reputation.

In this new line of pursuit, Mr Hunter commenced by investigating the structure of the more common animals, and making preparations of such parts as appeared, by analogy or otherwise, to throw light upon the animal economy. It was not his intention to make dissections of the whole of these animals, but to institute an inquiry into the various organizations by which the functions of life are performed, and thus attain to a knowledge of general principles. The design was nearly as original as it was great, for little, if any thing of the kind, had hitherto been accomplished.

It was at this time Mr Hunter detected the existence of lymphatic vessels in birds. He also traced further than had previously been done, the ramifications of the olfactory nerves, and discovered the course of some of the branches of the fifth pair of nerves—those nerves, a minute attention to the functions of which is even now leading to some of the most interesting discoveries of modern times. His observations on the latter of these subjects were made in the summer of 1754; and in them he had the assistance of Dr Smith, then a student in London, afterwards Savilian Professor of Geometry, and Lecturer on Physiology at Oxford. Short notices regarding their labours were published in 1786, in

a treatise entitled, "Observations on certain parts of the Animal Economy;" but these notices were taken from the description prepared by Dr Smith in 1754.

In 1755 or 1756, Mr Hunter made preparations and drawings of the growth of the chick, in the process of incubation. His extensive series of experiments and observations connected with this subject have never, so far as we know, been permitted to see the light; but we find him making some use of them in illustration of another subject, to which he applied all the energies of his mind; and they may be seen noticed in his well known work "On the Blood," &c.

So eagerly did Mr Hunter at this time attach himself to the study of comparative anatomy, that he left no means unemployed to obtain possession of the rarer kinds of animals, with the view of examining into their peculiarities. For this end, he applied to those who had the charge of the Royal Menagerie at the Tower, for the bodies of the animals that died there; and he made similar applications to all those who made a business of collecting and exhibiting wild beasts to the public. He also purchased any of the rarer animals which came in his way; and these, with such others as were presented to him by his friends, he entrusted to the showmen, to keep till they died, the more to encourage them to assist him in his labours.

After twelve years had been spent in the manner

which we have described, Mr Hunter, in the very midst of his career, suddenly left London. It must have been some very violent cause which could thus tear him from his favourite pursuits, and from the only scene in which they could be advantageously prosecuted. The cause is by no means a secret; and in explaining it, while we are required to expose the infirmities of two distinguished men, and the dissensions of two near relations, let us not fail to observe, how that as both were probably more or less to blame, so both suffered the penalty of their ungenerous conduct, in the embittered feelings which they carried with them to the grave.

Had William and John Hunter allowed just scope to their fraternal feelings, they might have added not only to their common success, but incalculably to their mutual happiness. Unfortunately, they were both equally ambitious, and both equally jealous of fame. Their proximity, and the identity of their pursuits, thus became a source of dissension; and the success of the one was apt to be regarded as an encroachment by the other.

It has been remarked, that Dr William Hunter was one of those fortunate men who are placed early in life exactly in the situation for which Nature and education designed them. He had a solid understanding, a correct eye, and an innate love of order, which evinced itself in every part of his conduct, and a perseverance which could only have been supported by a genuine love of his occupation, and the success which crowned his labours. His classical acquire-

ments were of a superior order. These, with his native endowments, gave him a facility of expression, and a most happy choice of words, joined to a talent for demonstration never to be exceeded. Whether from an originally correct ear, a refined taste, or the early society in which he mingled, his dialect had all the polish of the southern metropolis, with enough of the northern accent to strike and yet to please. His person, though small, was graceful — his cast of features regular and interesting — his voice musical — his manners attentive and flattering. In short, Dr Hunter was a polite scholar, an accomplished gentleman, a complete anatomist, and probably the most perfect demonstrator, as well as lecturer, the world had ever seen.

When his younger brother arrived in London, Dr Hunter entered upon the delightful task of instructing a scholar every way worthy of him — diligent, orderly, inquisitive, and of quick apprehension — it could not but add to his gratification that such a disciple was his near relation; and we can easily believe that their mutual satisfaction remained unbroken, so long as the elder might consider every discovery made under his eye, and in his premises, as his own property. But the relative position of the parties could not always continue to answer this description. The scholar became the equal, if not the superior, of his instructor; and as often as he ventured to offer a well-founded opinion in contradiction to, or even in anticipation of, his master, a trial of temper must have ensued — a trial which

the event too clearly shewed the character of the brothers did not qualify either of them to sustain.

Both the brothers were in the habit of committing their views to writing, even when they did not intend to give them an immediate publicity; and thus in their works, when at length published, we sometimes find a record of feelings of an early date, which, though not expressed to each other at the time, nevertheless operated on their mutual conduct. Thus, Mr John Hunter informs us, that, after making those investigations on the nerves of smelling to which we have already alluded, he immediately had drawings taken, with the view of presenting the account to the Royal Society; but other pursuits interposed. Of these very drawings, however, we find that engravings were afterwards made by Dr William Hunter; and they, and the preparations themselves, were repeatedly displayed in his lectures, while he at the same time explained to the students the inferences to be deduced from the discovery;—in other words, Dr Hunter appropriated to himself the merits of a physical discovery, and the physiological views thence derivable, all of which was properly due to his brother.

This, however, was by no means a solitary instance; and the particulars of another may be alluded to, as clearly exhibiting the nature of the offence, and the cause of the umbrage. In the month of May 1754, Dr Mackenzie, a friend of Mr Hunter's, had been particularly fortunate in procuring an interesting portion of anatomical structure, and so struck was

he with its value, that, before touching it, he secured Mr Hunter's attendance, and requested him to conduct the examination. This Mr Hunter accordingly did, in the presence of several individuals, and, with his usual address, succeeded in unravelling a structure, the anatomy of which had not before been understood. He immediately made some preparations illustrative of the facts, returned home in the evening, and communicated what he had discovered to Dr Hunter, who at first (says he) "treated it and me with good-humoured raillery; but on going to Dr Mackenzie's with me, he was soon convinced of the fact." After this, he and Dr Hunter together took opportunities of re-examining the point, which was thus made out to the complete satisfaction of all capable of judging. John's feeling, in his own words, was, that he had a just claim to the discovery of the structure, together with the further merit of showing the purposes of the structure so discovered. But, notwithstanding this, Dr Hunter in his lectures never took any notice of his brother's share in the investigation, and some years afterwards published a very splendid and elaborate work, in which he accurately delineated and minutely described the anatomy and physiology of the parts, without once mentioning the author, or the mode, of the discovery.

These two instances may suffice to shew the nature of that injury which was offered on the one side, and the cause of that offence which was felt

on the other. The injustice beyond all question was great, and was the less excusable, as coming from one so nearly related, and who was himself already basking in the brightest sunshine of popularity and success. That offence should have been taken can scarcely excite either surprise or censure. But still it can never be sufficiently lamented that two such men should have allowed occurrences of this nature, which, with a little kindly feeling, might have been so easily adjusted to their mutual credit, to become a source of heart-burning and division. We have not the means of judging how far these and similar occurrences were attended with personal altercation; but it is a melancholy fact, that the spark thus early kindled, occasionally burst into a flame, during the remaining years of their lives. Not that they lived in a state of uninterrupted hostility; very far from it, as we shall have ample occasion to observe in the sequel, and as the facts to which we have just been adverting themselves sufficiently evince. For, although these painful events occurred when John had been only six years in London, he continued in connection with his brother for six years longer. In fact, John's labours at this period contributed so much to his brother's museum, and were altogether so gratifying to his disposition, that though, as Sir E. Home remarks, in many respects they did not agree, the powerful bond of interest, in conjunction, it may be hoped, with the remnants of better feelings, long delayed their separation.

It is not to be doubted, that the unfortunate state of mutual feeling existing between the brothers was the main cause which induced John, at length, to determine upon withdrawing from London for a season. At the same time, it is not less certain, that the state of his health, impaired by incessant application, rendered change of scene, and a suspension of labour expedient. We find, accordingly, that he was advised to go abroad; and Mr Adair, Inspector-General of Hospitals, having appointed him a surgeon on the staff, he, in the following spring, accompanied the army to Belleisle, leaving Mr Hewson to assist his brother.

From these facts, we may conclude, that Mr Hunter's indisposition was not of a very alarming character, as, had it been dangerous in its nature, he would probably have sought for milder skies, and, at all events, would not have encountered the perils and fatigues incident to active military service. The change, however, besides effectually breaking up his connection with his brother, must have no doubt tended to invigorate his constitution; while active service with the army, presented to him the best possible field in which to familiarize himself with the countless details of an art which can be practically learned only by personal experience. Of these advantages there is no want of evidence that he assiduously availed himself, both for his own improvement, and for the advancement of science.

On the 29th of March 1761, a secret expedition

which had been some time in preparation, set sail from Spithead, and shaping its course for the coast of Brittany, reached Belleisle on the 6th of April. The land forces under Major-General Hodgson amounted to about 10,000 men, and the squadron under the command of Commodore Keppel, consisted of ten sail of the line, and sixteen frigates, and smaller vessels. An unsuccessful attempt to effect a landing was made on the 8th, when the troops were repulsed with the loss of 500 men, killed, wounded, and prisoners; but another and more fortunate attempt was made on the 22d. As no pains had been spared to put the island into the best state of defence, under the command of the Chevalier St Croix, one of the best officers of the French army, it was not till after much skirmishing, and the capture of several forts, that it finally surrendered on the 8th of June. In the interval between the landing and the capitulation, a reinforcement of 3000 troops, and five ships of the line arrived, raising the military force to 13,000 men. It was to this large force that Mr Hunter was attached in the important rank of Surgeon on the Staff. At the termination of hostilities, it was found that the British loss amounted to more than 300 men killed, and upwards of 500 wounded. Of the French garrison, a still greater number were left behind in the hospitals; and by a distinct article of the capitulation, these were to remain on the island during the treatment of their wounds. We have still to add, that the loss sustained from the ene-

my was but small, compared with that arising from sickness, the great fatigues of the siege, and the want of refreshment, bringing much disease along with them.

In the following year, hostilities commenced with Spain, and powerful succours were dispatched to the aid of Portugal. A small garrison being left in Belleisle, the greater part of the troops were conveyed to the Peninsula, and fresh reinforcements arrived from Britain, which enabled the army to cope with their powerful antagonists. The Spaniards, with 8000 French auxiliaries, invaded Portugal at three distinct points simultaneously; but, after very considerable success, and the capture of many towns, they were repulsed at all points towards the close of the campaign, so that they had not much to evacuate at the peace in November of the same year. Mr Hunter continued with the army after termination of hostilities, and did not quit it till 1763.

Few situations could have been more honourable than that filled by Mr Hunter in these campaigns, and few men were ever better qualified to discharge its important duties. He brought all his stores of knowledge, and all his acute powers of mind, to bear on the subject, and his unequalled industry did not flag when engaged in his country's service. The most ample proofs of his zeal, and the success attending it, were subsequently afforded by his career in London — by the estimation in which he was ever after held by the Army — by the prominence which, in his lec-

tures, he gave to Military Surgery — and by his publication on Gun-shot Wounds, &c. by which he introduced no inconsiderable improvement into the art.

But it is more to our purpose to remark, that, in these years of active service, Mr Hunter still found time for the prosecution of his favourite study of natural history. Many allusions to his observations and experiments made at this period, occur in papers which were not written till years afterwards. Our limits do not permit us to enter on an analysis of any of these observations, and still less of the papers in which they were presented to the public. But we cannot refrain from inserting one or two specimens, which will serve to verify the representations we have given of Mr Hunter's assiduity, and will at the same time exhibit the inventive and original character of his mind.

In a very elaborate paper of Mr Hunter's on the subject of Digestion, the following passage occurs: "In making comparative experiments upon the digestive power, the different animals should be under similar circumstances. They should be equal in age, in condition, in health. They should likewise be of the same temperature; for the different classes of animals are variously affected by the same degree of heat. Experiments made upon snakes in the winter, will differ greatly from those made in the summer; while similar experiments made on dogs will have nearly the same result in both seasons.

Nor will the powers of the stomach be found always equal in the same class. Sleeping animals of the quadruped kind, as hedgehogs, do not digest in the winter, but in the summer only; therefore conclusions drawn from experiments made in the one season, are not at all applicable to those made in the other. Spallanzani observed, that the snake digested food faster in June, when the heat was at 82°, than in April when it was only 60°, whence he concludes that heat assists digestion. But this heat is not the immediate but the remote cause of the increased power: heat having produced in the animal greater necessity for nourishment, and of course greater powers, gastric juice was therefore secreted faster, or in greater quantity. When at Belleisle in the beginning of winter 1761–2, I conveyed worms and pieces of meat into the stomachs of lizards when they were going into winter quarters, keeping them afterwards in a cool place. On examining at different periods, I always found the substances I had introduced entire, and without any alteration. Sometimes they were in the stomach, at other times they had made some progress down the *primæ viæ:* so that digestion is regulated by the other actions of the body. Warmth requires action suitable to that warmth; the body requires nourishment suitable to that action, and the stomach being called upon, performs the office of digestion."

From another of his papers, not less characteristic, and containing some particulars respecting his

pursuits, we make the following quotations: "Some time before I quitted my anatomical pursuits in the year 1760, I had discovered the organ of hearing in fishes, and had the parts exposed and preserved in spirits. In some, the canals were filled with coloured injections, which shewed them to great advantage, and others were so prepared as to fit them for dried preparations. Of what I then accomplished I now present a brief sketch, reserving a more complete examination of the subject for a larger work, on the structure of animals, which I one day hope" (but never realized) "to have it in my power to publish. I had these parts also injected in other animals, both with wax and metals, which, when separated from the bone, make elegant casts of these canals. My researches in that, and in every part of the animal economy, have been continued ever since. I am still inclined to consider what is uncommon in the structure of this organ in fishes, as only a link in the chain of varieties displayed in its formation in different animals, descending from the most perfect to the more imperfect in a regular progression. The preparations to illustrate these facts have been ever since shewn in my collection to both the curious in this country, and to foreigners. In shewing what was new, or supposed to be new, the ear of fishes was always considered by me as one important article.

"It varies in different genera of fishes, but in all, it consists of three curved bones, which unite one

with another: this union forms in some only one canal, as in the cod, salmon, ling, &c., and in others a tolerably large cavity, as in the ray kind. In the jack, there is an oblong bag, or blind process, which is an addition to these canals, and communicates with them at their union. In the cod, &c. this union of three tubes stands upon an oval cavity; and in the jack there are two: the additional cavities in these fishes appearing to answer the same purpose with the cavity observed in the ray, or cartilaginous fishes.

"I will here mention an experiment, to shew that sounds affect fishes very much, and is one of their guards, as it is in other animals. In the year 1762, when I was in Portugal, I observed in a nobleman's garden, near Lisbon, a small fish-pond, full of different kinds of fish. The bottom was level with the ground, the pond having been made by forming a bank all round, and it had a shrubbery close to it. Whilst I lay on the bank, observing the fish swimming about, I desired a gentleman who was with me to fire a loaded gun from behind the shrubbery. The reason for desiring him to go behind the shrubs was, that there might not be the least reflection of light. The moment the report was made, the fish seemed to be all of one mind, for they vanished instantaneously, raising a cloud of mud from the bottom. In about five minutes after, they began to reappear, swimming about as before."

During Mr Hunter's absence with the army, the

kindly feelings of his brother towards him appeared to have revived in full vigour, and no opportunity was omitted of making honourable mention of his name. It is in reference to this period of their history, that Dr Adams has the following passage:— "My friend Dr Cogan, who, happily for all those who share his acquaintance, lives to relate transactions of more than half a century, informs me, that in the winter 1762-3, Dr Hunter would frequently introduce in his lectures — "In this I am only my brother's interpreter;—I am simply the demonstrator of this discovery—it was my brother's." Dr Cogan adds, the frequency of such expressions naturally inspired all the pupils with admiration of Mr Hunter's skill in anatomical researches, and of the Doctor's ingenuous conduct. Such facts only heighten our regret that any other feelings should have ever influenced either of the brothers.

In the year 1764, we find Mr Hunter relieved by the peace from active military duty, and returned to engage in the arduous occupation of a London surgeon. From what has just been mentioned, we shall not be surprised to learn, that he received the most cordial reception from his brother. In a volume of Medical Commentaries published this year, Dr Hunter introduced three papers of his brother's on anatomical subjects, which displayed his ability whilst acting as his assistant; and we find that the Doctor found other opportunities to prove his fa-

vourable regard, and effectually to promote his brother's interests.

Mr Hunter seems to have fixed his residence in Golden Square, choosing that central situation with a view, no doubt, to practice. Among the many eminent professional men with whom he now entered into competition, we find the distinguished names of Hawkins, Bromfield, Sharpe, and Pott, who embraced a large share of family practice, whilst Adair and Tomkins enjoyed the chief practice derived from the Army. Mr Hunter, at the same time, engaged in teaching practical anatomy and operative surgery, —departments in which he could have had few equals; and these courses he continued for several winters.

At this period of his life, we are informed by one who knew him well, that he was extremely companionable, mixed freely in society, drank his bottle, told his story, and enjoyed a laugh. But his scientific pursuits soon absorbed all his time. His professional engagements increased, and he entirely surrendered himself to his inclination for natural history and comparative anatomy.

His plans for the prosecution of this object were speedily formed, and evinced his characteristic energy. Finding that his experiments could not be carried on advantageously in the midst of a large town, he purchased, with his hard-earned savings, a piece of ground, then about two miles from London, be-

yond Brompton, and built upon it a house, well known by the name of Earl's Court. This was his *Tusculanum*, his favourite summer retreat, where he spent a large portion of his time, and provided, at great expense, accommodation for the animals he collected around him. No person of common curiosity could pass this original dwelling without making inquiry concerning its proprietor; and, on a nearer survey, a lawn was discovered in the rear, crowded with birds and beasts, and creeping things, of the strangest selection in nature.

His fondness for his pursuits, and his repeated watchings of the peculiar habits and instincts of these animals, made many of them familiar with him. This, however, was not unattended with risk, and sometimes brought him into situations of danger, of which the following instance may be given. Two leopards which were kept chained in an outhouse had broken from their confinement, and got into the yard among some dogs, which they immediately attacked. The howling produced, alarmed not only the menagerie, but the whole neighbourhood. Upon running hurriedly into the yard to see what was the matter, Mr Hunter found one of the leopards scaling the wall, and about to make his escape, while the other was beset by the dogs, and fully engaged with his opponents. Mr Hunter immediately seized both, and carried them back to their den; but no sooner were they secured, and time was allowed to reflect upon the risk to which

he had been exposed, than he nearly fainted from agitation.

Thus situated, the first few years of Mr Hunter's residence at home passed away busily but unobtrusively. While teaching anatomy and surgery, he was at the same time assiduously carrying on investigations by which he expected to extend the knowledge of the former, and to improve the practice of the latter; and in the formation of his museum, he was taking the best possible means of embodying and illustrating all his researches. He was laying in a vast stock of knowledge, and arranging it according to a natural order; and it was from these stores that, at a future period, he supplied those productions of his pen, which surprised almost as much by their number as their originality. Amongst many other subjects which at this time occupied his attention, we may mention, that he carried on an extensive set of experiments on young animals, to ascertain the facts regarding the growth of their bony structure; and, by feeding them with madder, which tinges bone of a red colour in the act of its formation, he detected many curious phenomena. He pushed the inquiry still farther, and, by another set of experiments, ascertained the effects of injuries and accidents on bones; the laws according to which their diseases are induced, and the treatment by which a restoration to health is to be expected.

In the year 1767, Mr Hunter, while dancing, like Dr Monro, and several other eminent anatomists, had

the misfortune to break his Tendo-Achilles. This led him to pay particular attention to broken tendons, and engaged him in experiments upon dogs, with the view of elucidating the subject. He did not in his own case, follow the then prevailing practice, which required confinement to bed; but, by means of raising the heel, bandaging, &c. he was enabled to walk about the third day after the accident.

In February of this year, Mr Hunter was chosen a Fellow of the Royal Society, an earnest of those many honours which were subsequently heaped upon him. His desire to avail himself of every means of improvement led him, at this time, to propose to Dr George Fordyce, and Mr Cumming, the eminent mechanic, to adjourn from the meetings of the Royal Society to some neighbouring coffee-house, and discuss such subjects as were connected with science. This plan was no sooner commenced and known, than the numbers increased. They were soon joined by Sir Joseph Banks, Dr Solander, Dr Maskelyne, Sir George Shuckburgh, Sir Harry Englefield, Sir Charles Blagden, Dr Beattie, Mr Ramsden, James Watt of Birmingham, and many others. At these meetings, discoveries and improvements in different branches of philosophy were the subjects of consideration; and the works of the members were read over and criticised, before being given to the public.

Next year, Mr Hunter became a member of the Royal College of Surgeons; and, almost immediate-

ly after, on the death of Mr Gataker, he, through his brother's kind aid, and most powerful influence, attained the high and envied situation of Surgeon to St George's Hospital. In this situation, he was long pre-eminently popular, the youths of the Hospital crowding around him, and listening to his remarks with the profoundest attention.

In 1770, Dr William Hunter having removed to his new and superb premises in Great Windmill Street, made over the lease of his former mansion to his brother, and John took up his abode in the house in Jermyn Street, well situated for practice, and in all respects commodious.

Like many other hospital-surgeons, Mr Hunter was now in the practice of receiving house-pupils; whose advantages must have been great, in enjoying familiar intercourse with a man equally eager in acquiring and in communicating knowledge. Nor was the advantage to the teacher merely pecuniary: many of his experiments, if not conducted, were at least greatly assisted by men in the vigour of youth and health, to whom the treasures of natural knowledge were thus presented under the fairest forms, aided with all the charms of novelty. The illustrious Dr Jenner was one of these fortunate individuals, and one who did not fail to take every opportunity of manifesting his gratitude to his master and friend.

The year 1771 was signalized by the publication of Mr Hunter's treatise "On the Natural History

of the Teeth," a work which led the way in rapid succession to many others. This was the only work he sold to the booksellers, as all his others were published on his own account, or were introduced into the miscellaneous collections of the day.

It was in July of this year that Mr Hunter, at the age of forty-three, united himself in marriage with Miss Home, eldest daughter of Mr Home, Surgeon of Burgoyne's Regiment of Light Horse, with whom he had served in Portugal. The engagement had been of several years' standing; but Mr Hunter had not the art of accumulating money, being given to spend all that he got upon his favourite pursuits; so that it required a considerable time before he could sustain the expenses of matrimony. He was captivated, not only by the lady's personal attractions, but also by those mental endowments which she possessed in a very eminent degree. She had given much attention to the fine arts, and subsequently exhibited specimens of poetry, possessed of more than ordinary merit. By means of these qualities, united to a sweet natural disposition, she contributed much to soothe the anxious cares of her husband's troubled life.

At this period, Mr Hunter's private practice, and his professional character, were rapidly advancing; but still no small portion of his time was devoted to his museum, which, as it daily became more extensive, was also attended with increased expense. The whole suite of the best rooms in his house in

Jermyn Street was speedily occupied by it. It was about this time, that, having received the present of a stuffed cameleopard, which, from its height, could not otherwise be placed, he, with true surgical skill, subjected it to the operation of a temporary amputation of the legs, and so accommodated it in the lobby.

Earl's Court, though a delightful retirement to Mr Hunter from the fatigues of his profession, did in no respect afford a cessation from labour. On the contrary, his researches were carried on there with less interruption, and with an unwearied perseverance. From this time (1772) till his death, he made it his custom to sleep at Earl's Court during the autumn months, coming to town only during the hours of business in the forenoon, and returning to dinner.

It was here he carried on his experiments on digestion, on exfoliation, on the transplanting of teeth into the combs of cocks, and all his other investigations on the animal economy. Not only the common bee, but the wasp, the hornet, and the less known species of bees, were made subjects of investigation. Here also he made his series of preparations of the external and internal changes of the silk-worm; also, as before noticed, a complete series of the incubation of the egg. Here, too, it was that he pastured and trained those buffaloes which he put into harness and trotted through the streets of London so late as 1792. The growth of vegetables

was also a favourite subject of inquiry, and one in which he was at all times engaged in prosecuting some experiments.

It was his favourite amusement in this retreat to walk about among his birds and beasts, attending to their habits and actions. The fiercer animals were those to which he was most partial, and he had several of the bull kind, from different parts of the world. Among these was a beautiful small bull which he had received from the Queen, with which he used to wrestle in play, and entertain himself with its exertions in its own defence. In one of these contests, the bull overpowered him, and got him down; and, had not one of the servants accidentally passed by, and frightened the bull away, the frolic would probably have cost him his life.

About this time, he was requested by Sir John Pringle, then President of the Royal Society, to draw up a paper for the consideration of that learned body. This paper led the way to many others; and throughout his life, and more especially during the next ten years, he was unremitting in supplying the Society with communications. We may state, in a few words, the more immediate occasion of that to which we have just adverted. Sir John Pringle having lost a patient, engaged Mr Hunter to examine into the cause of death. At the examination, a portion of the stomach was, to the astonishment of the by-standers, found so entirely dissolved, as to

be literally awanting. Mr Hunter's inquiries on the subject of digestion here came to his aid, and he informed them that he did not participate in their surprise — that the appearance was not new to him — and that it arose from the peculiar properties of the gastric juice, which, under certain rare and peculiar circumstances, possessed the power of destroying, immediately after death, to a greater or less extent, the very organ which had secreted it. This was not only an important fact in general pathology which Mr Hunter had ascertained, and which was previously unknown, and subsequently denied, but it bore, in an important way, on the subject of death by poisons, and shortly led to Mr Hunter's taking a prominent part, as a witness, in a case of life and death, to which we shall presently advert.

In the early part of 1773, Mr Hunter was the subject of a very violent and alarming, though transient attack of illness, which came on unexpectedly, and apparently in consequence of an affair which acutely affected his mind. It exhibited itself under the form of an excruciating pain at the pit of the stomach. So violent was the pain, that he tried every position to procure ease: he sat down, walked, laid himself on the carpet, then upon chairs, but could find no relief. When he was walking about the room, he cast his eyes on a looking-glass, and observed his countenance to be pale, his lips white, having the appearance of a dead man. This alarmed him, and led him to feel for his pulse; but he

found none in either arm. He now thought his complaint serious, and several physicians were sent for, his brother, Sir G. Baker, and many others; but none could find a pulse. The pain still continued, and he found himself at times not breathing. Being afraid that death would soon take place if he did not breathe, he produced voluntarily the act of breathing, the sensitive principle, with all its effects on the machine, not being in the least affected by the complaint. In this state he continued for three quarters of an hour. At length the pain abated, the pulse returned, though very weak at first, and involuntary breathing was restored. In two hours he was perfectly recovered, and his health was scarcely impaired during the next three succeeding years.

In 1773, Mr Hunter determined to become a public lecturer on the theory and principles of surgery, his reasons for which were usually explained as often as he began his course. He stated, that he had so frequently been compelled to hear his opinions either incorrectly quoted, or delivered as the discoveries of others, that he found it absolutely necessary himself to explain them systematically. At the same time, he dwelt much on the advantages every man derives from putting his thoughts in writing. He compared it to a tradesman taking stock, without which he neither knows what he has, nor what he needs. For two years he read his lectures gratuitously to the pupils of St George's Hospital, and in 1775 publicly delivered them in his house

in Jermyn Street, on the terms of other teachers. Delivering lectures was always particularly unpleasant to him; so that his desire of submitting his opinions to the world, and learning its general estimate of them, were scarcely sufficient to overcome his natural dislike to public speaking. He never gave the first lecture of his course without taking laudanum, to take off the effect of the uneasiness.

His class was not large, and of those who attended him, the greater part acknowledged the difficulty they had in comprehending him, which was often proved by their incapacity of keeping up their attention. He seemed quite conscious of the difficulty he experienced in making himself understood, and yet appeared delighted when he succeeded, always waiting at the close of each lecture to answer inquiries, and evincing evident satisfaction when the questions put were pertinent, and when he perceived that his answers were satisfactory and intelligible.

He was so diffident of himself, that he trusted nothing to memory. He wrote his lectures on detached pieces of paper, and, such was his confusion, that frequently he found himself incapable of explaining his opinions from his notes; and, after having in vain attempted to recall the transitory ideas, now no longer floating in his mind, nor obedient to his will—after having in vain rubbed his face, and shut his eyes, to invite disobedient recollection, he would throw the subject by, and take up another. Although a great part of the contents of his lectures

were afterwards copied out fair by another hand, yet, in every fresh course, upon any new opinion requiring to be stated, scraps of paper were introduced, and renewed embarrassments were encountered in explaining them.

This unusual and extraordinary difficulty was observed in Mr Hunter, as we have already hinted, at an early period, and it continued unabated, till the close of his career. It has given occasion to much remark, and has been variously accounted for. Something no doubt must be charged to the effects of his early education; for, as a contemporary observes, "to imagine that this undertaking of lecturing was carried on with equal facility by John Hunter, as it could have been had he been properly educated, would be romantic, more especially as nature had been very sparing to him in the gift of elocution."

We may further illustrate this peculiarity in Mr Hunter's mental constitution, by noticing the appearance he made on the celebrated trial of Donellan for the murder of Sir Theodosius Broughton. A plot, it was alleged, having been laid to make away with this young Baronet, a draught of strong laurel-water was administered to him while in perfect health, in consequence of which death ensued in a few hours, attended with all the symptoms of poisoning from that preparation. The Oxford Professor of Anatomy, with all the faculty in the neighbourhood, had decided that the deceased had been poisoned. Mr Hunter's high celebrity, and

the paper he had read before the Royal Society, led to his being brought as a witness, and with respect to his appearance, it may be enough to quote the words of the learned Judge in his able charge to the Jury: "For the prisoner you have had one gentleman called, who is likewise of the faculty, and a very able man. I can hardly say what his opinion is, for he does not appear to have formed any opinion at all in the matter. He, at first, said he could not form an opinion whether the death was, or was not, occasioned by the poison, because he conceived it might be ascribed to other causes. I wished very much to have got a direct answer from Mr Hunter, if I could, as to what, upon the whole, was now the result of his attention and application to the subject, and what was his present opinion; but he says he can say nothing decisive."

This brief notice, however, gives in fact but a most imperfect idea of Mr Hunter's embarrassment, and, as he was himself aware, apparent equivocation on this important trial. The nature of his evidence was not only remarked by the Jury and the Court, but became matter of general observation. It would almost appear that there was a difficulty of expressing himself, arising not merely from a defect of language, but from a certain degree of inaccuracy and confusion of thought. As a man of genius, he unquestionably thought much and deeply, and that, too, on very abstruse subjects; but still there were not wanting some who maintained that the same

perplexity and obscurity pervaded many of his views; and the mode by which such persons solved the difficulty, was by alleging that Mr Hunter did not understand himself.

It must be allowed that some of his writings are far from being perspicuous, whilst others, again, are clear, and readily understood. In conversation he expressed himself grammatically and well, and yet it is certain he never could lecture satisfactorily, and that he wrote with difficulty, and often incorrectly. Like some other eminent men of science, he is said not unfrequently to have obtained in the revision of his works the aid of friends, and of other literary men, whose services he could more certainly command; and among the latter of these, the famous Smollet has been named, as one who occasionally lent his assistance.

In the spring of 1776, Mr Hunter again experienced a very severe attack of sickness;—differing from the former, but still, like it, of a singular character. It originated, as the previous attack had done, by violent agitation and anxiety of mind, produced, in the present instance, by a heavy and unexpected pecuniary loss. In the course of the day he had taken a short journey in a post-chaise, during which he had felt as if he had drank too much. At night, he had no sooner laid down in bed, than he felt as if suspended in the air, and soon after, the room appeared to go round; the quickness of the motion seemed to increase, and at last was very rapid.

It continued for some time; then became slower and slower, till the whole was at rest. After this, he slept pretty well, and continued so during the course of the next day. On the succeeding day, however, the symptoms returned. He could now hardly move his head from the horizontal position, and was brought home in his carriage, the motion of which was most disagreeable. On getting to bed, the giddiness, and the idea of being suspended in the air, increased, and the least motion of the head upon the pillow appeared to be so great, that he hardly durst attempt it. If he moved his head but half round, it appeared to be moving to some distance with great velocity. The idea that he had of his own size was that of being two feet long; and when he drew up his foot, or pushed it down, it appeared to him to be moving a great way. All his sensations, too, of light and sound, became most painfully acute. He remained in this state for about ten days, and was fed as he lay. After this, his ideas of his state became more natural: the deception concerning his size was in part corrected, and the feeling of suspension in the air ceased. For some time the fire appeared of a deep purple red. When he got so well as to be able to stand without giddiness, he was unable to walk without support, for his feelings did not inform him concerning his centre of gravity, so that he was unable to balance his body, or prevent himself from falling.

The real nature and cause of this attack, as of

the former, seems to have entirely eluded both his own ingenuity and the acumen of the faculty; nor does it appear that medicine proved of the slightest benefit. As soon as he was able he went to Bath, where, however, he staid but a short time, being very anxious to resume his various employments; and in a few weeks he got well.

Mr Hunter was now advancing rapidly into public celebrity: he still enjoyed the patronage of his brother, at this time in the highest credit with the Royal Family and the high nobility; and in 1776 he had the honour of being appointed Surgeon Extraordinary to the King; and, ten years afterwards, was gazetted as Deputy Surgeon-General to the Army. Professional success, however, was never the ultimate aim of his ambition; and he prosecuted it with ardour, mainly as affording the necessary means for the attainment of those scientific objects on which his soul was centred. The emoluments of his profession were unremittingly lavished on these objects, and every moment he could redeem from his necessary engagements was devoted to his scientific pursuits. The results of these labours were most abundant.

In 1773, at the request of Mr Walsh, he dissected the Torpedo, and laid an account of the electrical organs before the Royal Society.

A young elephant presented to the Queen by Sir Robert Barker, having died, the body was given to

Dr William Hunter. This afforded his brother an opportunity of examining the structure of that animal. After this time two other elephants died in the Queen's Menagerie, and both of them came under Mr Hunter's examination.

In 1774, he published in the Philosophical Transactions an account of certain receptacles of air in birds, which communicate with the lungs, and are lodged both in the soft parts and in the hollow bones of these animals. He also published this year a paper on the Gillaroo Trout, commonly called in Ireland the Gizzard-trout.

In 1775, several animals of that species called the *Gymnotus electricus* of Surinam having been brought alive to this country, excited the greatest curiosity by their electrical properties. Mr Walsh being desirous of pursuing his investigations in animal electricity, made a number of experiments on the living animals; and to give his friend Mr Hunter an opportunity of examining them, he purchased those that died. An anatomical account of their electrical organs was drawn up by Mr Hunter, and published in the Philosophical Transactions. In the same volume, there is another paper by him, containing an account of his experiments on animals and vegetables, respecting their power of producing heat.

In 1776, he read the first of the Croonian Lectures delivered by him, choosing Muscular Action for his subject, and prosecuting it through a series

of six lectures, which were delivered in as many years. In these lectures he collected his numerous observations on Muscles — treated of their powers, and the effects of the stimuli by which they are affected — and illustrated these points by comparative observations upon the moving powers of plants.

The efforts of the Humane Society having drawn much public attention about this time, in consequence of the exertions of Dr Cogan and Dr Hawes, and the institution having at length been recognised as a royal establishment, Mr Hunter's abilities were put in requisition by his friends, and he accordingly read a long and interesting paper on the subject in the Royal Society, entitled, " Proposals for the recovery of persons apparently drowned."

In 1777, he read a second paper on the heat of animals and vegetables; and at this time published the second part of his treatise on the Teeth. In 1779, he gave a description of the Free-Martin in the Philosophical Transactions; and in rapid succession, an account of an extraordinary Pheasant — of the Organ of Hearing in Fishes — on a new Marine Animal — observations on the Wolf, Jackall, and Dog — on the Structure and Economy of Whales — and, finally, as late as 1792, Observations on Bees. Besides these, other papers appeared in his work on the Animal Economy, published in 1786. Several were on natural history. Such, for example, was his paper on the Secretion in the Crop of Breeding Pigeons for the nourishment of their young — on

the colour of the *Pigmentum nigrum* of the eye in different animals; whilst others of a more professional character at the same time appeared, both in the work last noticed, and also in the Philosophical Transactions. In 1787 the Royal Society conferred upon him its Copleyan Medal, probably not more on account of the intrinsic value of his communications than on account of his amazing assiduity and success.

It must be evident, that the very multiplicity of these productions, which it is necessary to enumerate, precludes the possibility of giving any thing like a detailed account of them. To convey some impression, however, though most inadequate, of these labours of Mr Hunter, we shall select one paper, and, in as few words as possible, give an account of it. We take up that on the Structure and Economy of Whales. After some prefatory remarks on the extreme rarity of opportunities for prosecuting the investigation, as they inhabit distant seas, and cannot be brought to us alive, he remarks, "I have availed myself as much as possible of all the accidental opportunities that have occurred; and anxious to get more extensive information, I engaged a surgeon, at considerable expense, to make a voyage to Greenland, and furnished him with such necessaries as I thought might be requisite for examining and preserving the most interesting parts, and with instructions for making general observations; but the only return I received was a piece of a whale's skin, with some small animals sticking to it." Mr Hun-

ter somehow found opportunities of minutely examining the Porpoise, two Grampuses, a Bottle-nosed Whale, and the *Balæna rostrata* of Fabricius. The large Whalebone Whale, the Spermaceti Whale, and the Narwhal, had also fallen under his inspection. "Some of these," he remarks, "I have examined with accuracy, whilst others I have only examined in part. Having thus acquired a general knowledge of the whale tribe, I have been enabled to form a tolerable idea of the whole;" and a popular epitome he embodies in the subsequent parts of the communication. He comments on their being mammalia, and yet aquatic animals, on the mode in which their internal structure is modified to suit their external exigencies, on their shape, general figure, and appearance. He then gives a distinct description of their osseous structure, the tail, the fat, including a long disquisition on spermaceti, of the skin, their mode of collecting food, their teeth and whalebone, the account of which is excellent; then the whole of their viscera, the windpipe and blowholes, forming the best account we have seen; the brain and the several organs of sense. The paper is accompanied with illustrative drawings, and as for many years it was the best description, so is it much prized even at the present day.

About this time honours were showered thick upon Mr Hunter. He was elected Fellow of the Royal Society of Science at Gottenburgh, and of the American Philosophical Society, and also of both

the Royal Society of Medicine, and of the Royal Academy of Surgery, at Paris.

Mr Hunter continued twelve years in his house in Jermyn Street, when the lease having expired, and the house affording very inadequate accommodation for his museum, he was necessitated to remove. After many difficulties and disappointments, he purchased the lease of a large house in Leicester Square, and the whole lot of ground extending to Castle Street, in which there was another house; and in the middle space between the two, he erected a building for his museum, on which he expended L. 3000.

In this building there was a spacious apartment fifty-two feet long, by twenty-eight wide, lighted from the top, and having a gallery all round for accommodating his preparations. Under this there were two apartments, one for his class-room, and another afterwards used for weekly meetings of his medical friends, during the winter. To this building the house in Castle Street was entirely subservient; its rooms being used for the different branches of human and comparative anatomy.

His museum continued to enlarge with increasing rapidity, for which he was in no small degree indebted to the friendship of Sir Joseph Banks, who not only allowed him to take any of his own specimens, but procured him every curious animal production in his power, and afterwards divided betwixt him and the British Museum all the specimens

of the animals he had collected in his voyage round the World. To his friend the Honourable Sir Charles Greville, Mr Walsh, and many others, he was also under particular obligations; and thus Mr Hunter lost no opportunity of turning his high celebrity to the best possible advantage. If any thing of importance happened within the range of Comparative Anatomy, Mr Hunter was sure to be apprized of it. If a mummy were to be examined, or a body to be embalmed; if any curious structure was discovered, or if any thing strange in nature attracted attention, Mr Hunter's services were applied for, and were readily granted. Possessing such opportunities, and obtaining materials from such varied sources, standing nearly alone in this branch of science, no new animal was brought into the country which was not shewn him; very many were given him; and of those which were for sale, he commonly had the refusal. Under these circumstances his collection made a progress which would otherwise have been impossible.

It was at this time that Sir Everard Home, then a young man, and staff-surgeon just returned from foreign service, attached himself to the fortunes of Mr Hunter, and adhered to him with a pertinacity which increased with their years, and terminated only with Mr Hunter's life. Sir Everard was his brother-in-law. The year after Mr Hunter's marriage, Everard became his pupil, continuing with him for six years. For a period of six years thereafter

he was engaged in service in various parts of the world, during which time he procured and transmitted to Mr Hunter many interesting objects of natural history; and now he returned to afford him still more immediate aid.

Nor was Mr Home the only individual to whose active personal aid Mr Hunter was indebted. Among various other individuals, the names of Mr Bell and Mr André deserve to be particularly mentioned. In the course of his pursuits Mr Hunter met with many parts of animals where the natural appearances could not be preserved; hence the importance of having correct drawings of such subjects taken. The expense of employing professed artists, the difficulty of procuring them, and the disadvantage under which they laboured in being ignorant of the subject they were to represent, made him desirous of having an able person in his house entirely for that purpose. With this view, he, so early as 1775, entered into an engagement for ten years with Mr Bell, an ingenious young artist, who agreed to live with him, and devote his whole time to drawing and making anatomical preparations. Mr Bell soon became a good practical anatomist, and was thus enabled to give a striking and accurate delineation of the subjects presented to his pencil. By his labours, Mr Hunter's collection is enriched with many valuable drawings, and a great variety of curious anatomical preparations. After working for fourteen years with Mr Hunter, and obtaining his surgical diploma, Mr

Bell obtained an appointment as assistant-surgeon, and went to Sumatra, where he died a year before his first master and patron.

Mr André's connexion with Mr Hunter began at a later period, apparently about 1784. He joined Mr Hunter when already a first-rate anatomist. He was bred in the school of Watson, and seems to have made preparations purely from the admiration of the art. His delight in excellence was such, that he would not allow any undertaking to leave his hands with the possibility of its being improved. His knowledge of natural history, and his modest deportment, made him a valuable assistant.

It was while enjoying such assistants as these, that Mr Hunter, in April 1785, removed his collection to his new museum room in Leicester Square. The ardour with which this arrangement was made, may be illustrated by the following anecdote. One day the late Dr Gartshore finding Mr Hunter very busy in his museum, exclaimed, "Ah! John, you are always at work." "I am," replied Mr Hunter, "and when I am dead you will not soon meet with another John Hunter."

But in the midst of all this occupation and success, Mr Hunter was not without his share of trials and disappointments; for his prudence was moderate, and his feelings were more than ordinarily acute. He was always a bad economist; not that he squandered his hard earned gains in pleasure or ostentation, but his passion for natural history was ever apt

to carry him into an excess which, however laudable, in some points of view, was nevertheless attended with the usual penalties of imprudence, not less than more vulgar extravagance. We have already seen that his marriage was delayed for several years on account of the embarrassed state of his affairs; and notwithstanding this sacrifice, Sir E. Home informs us, seven years afterwards, that his annual expenditure had always exceeded his income. At a later period, again, when he purchased the leasehold in Leicester Square, he was enabled to defray the expense only by means of mortgages, and for several additional years, he used to regret that all he could collect in fees went to carpenters and bricklayers. Mr Hunter was not the man who could be exposed to the annoyances arising from such a state of his affairs, without feeling it most keenly, and we have accordingly seen that both his attacks of illness were connected with his embarrassments. For a considerable time his professional income increased but slowly. During the first fourteen years after his settling in London, it did not average L. 1000 a year, but it subsequently improved greatly, amounting for several years previous to his death to L. 5000, and at the time of that event it had reached L. 6000.

But there was another source of distress of a still bitterer kind, arising from a revival of his unfortunate dissensions with his brother William, a subject which, though painful, is not without both interest and instruction. We have seen William's kindness to his brother on his first arrival in London; and

we have likewise had the pleasing duty of recording several subsequent instances of affectionate interest. But we have also had occasion to trace some symptoms of rivalry and selfish jealousy which seemed to indicate that the preservation of a certain distance between the brothers was essential to their mutual harmony. For years this plan succeeded; or, at all events, there was no apparent rupture. In 1780, however, there occurred a crisis, the immediate cause of which is not perhaps very well ascertained. The most probable account, however, states it thus. Mr Hunter having on hand some interesting anatomical investigation, invited his brother William to come and witness it; when he, conceiving that the preparation would prove a very valuable addition to his own museum, caused it to be conveyed to his premises in Great Windmill Street, and when subsequently claimed by John, he refused to return it.

It has been said that a great French anatomist was wont to express his opinion of his more eminent professional brethren in these few words: *Grand anatomiste, grand voleur;* and it would appear that the apophthegm ought not to be restricted to one side of the Channel. John Hunter has not escaped from similar charges any more than his brother; not that he has been accused in any instance of direct pilfering; but in regard to scientific discovery and literary property, it has been frequently alleged that he concealed the successful labours of others, and claimed the results as his own. We

have neither space nor inclination to enter into an investigation of these charges; but historical honesty required us to mention that they had been advanced; we believe them to be untrue; and having thus noticed them, we willingly dismiss the subject.

At the time when the unfortunate accident we have just mentioned occurred, William Hunter was caressed by fortune, and abounding in wealth; John, on the other hand, was poor. In these circumstances, William, who had been the liberal patron of his brother early and late, may perhaps have thought that he might be allowed to gratify himself in a trifle, however unceremonious the mode he took of obtaining it. But this was by no means in accordance with John's nature. He would not submit to what he considered an insult as well as an injustice, and he determined to resent it. The affair of the anatomical discovery before alluded to (p. 31), in which Dr Mackenzie had a part, had now slept for the best part of twenty years. In an unhappy hour John determined to revive it, and with that view to send a full account of the circumstances to the Royal Society. This was five years after William had published his splendid work, in which only a general acknowledgment was made to his brother. Mr Hunter's communication was accordingly read; but at the next meeting Dr Hunter put in his claim to the discovery in question, and John replied. The Society manifested its sense of the affair, and its consideration for the brothers, by publishing none of

the papers; though they are still preserved in its Archives.

The breach thus made was too wide to be healed. William Hunter survived for three years, but it does not appear that the brothers ever again met on friendly terms. At his death, Dr Hunter, though fully aware of his brother's embarrassments, did not leave him a single shilling of his splendid fortune; nay, he conveyed to a more distant relation, the family property of Long Calderwood, and allowed his brother no share in the superintendence of his museum. To the honour of the late Dr Baillie, the nephew of the brothers, and the residuary legatee, it ought to be recorded, that he lost no time in conveying the family estate, as well as the lands of Kilbride, to Mr John Hunter.

Dr Hunter's last illness having been protracted for about ten days, John availed himself of the opportunity to ask permission to visit the dying bed of his only brother, patron, and instructor, and the request was complied with; but we have it not in our power to state that there was any mutual explanation or hearty reconciliation. The survivor felt the parting scene most severely. The melancholy event occurred just at the conclusion of his course of lectures; and circumstances having led him to allude to it in the class, an eye-witness informs us that Mr Hunter seemed to finish, yet to have more to say; at length appearing as if he had just recollected something, he began,—"Ho! Gentlemen, one thing

more:—I need not remind you of ———. You all know the loss anatomy has lately sustained." He was obliged to pause, and turn his face from his hearers. At length recovering himself, he stated that Mr Cruickshank would occupy the place of Dr Hunter. This, and a few words more, were not spoken without great emotion, nor with dry eyes. The scene was so truly pathetic, that a general sympathy pervaded the whole class; and every one, though all had been preparing to leave the place, stood or sat motionless for several minutes.

The period of Mr Hunter's removal to his sumptuous premises in Leicester Square, with a few succeeding years, may be regarded as the brightest era of his life. He was then at the height of his surgical career. His mind and body were both in full vigour. His hands were capable of performing whatever was suggested by his mind, and his judgment was matured by a most ample experience. At this time he performed many successful operations, and his improvements in the art of surgery were numerous and splendid. (Witness his treatment of Aneurism, Hydrocele, &c.) He was engaged in very extensive practice; was Surgeon to St George's Hospital; delivered a long course of lectures during the winter; kept up a School of Practical Anatomy, while he was all along forwarding his discoveries in Comparative Anatomy and Natural History, and accumulating in his museum many splendid proofs of his indefatigable zeal.

About this period he published his great Practical Treatise on Surgery; and it may be mentioned as one of the peculiarities of his character, that he chose to have his works printed, published, and sold in his own premises; till finding that the plan was unpopular with the booksellers, he abandoned it.

About the same time, Hawkins had withdrawn from practice, and Sharp was following his example, and Mr Hunter was the individual who principally supplied their place. He was highly esteemed by the rising generation of medical men, who seemed to quote him, as the schools at one time quoted Aristotle. And in nearly the same estimation was he held by those who were not of the profession. Every thing that John Hunter now did, was considered by the public as being done in the best possible method. Mr Pott died in 1788, and this again brought Mr Hunter a vast accession of practice. "It placed him," says a contemporary, "upon a footing equal, if not superior, in point of practice to any living competitor. I think I may affirm that his consultations were more in fashion than any other surgeon's, and that his range of practice was more extensive."

In 1789 Mr Hunter was elected Member of the Royal College of Surgeons of Ireland; and he now also obtained the more substantial and lucrative situations of Surgeon-General of the Army, and Inspector-General of Hospitals. These appointments gave him patronage as well as consideration, but

brought of course along with them additional occupation and anxiety.

In 1792 he was elected one of the original Vice-Presidents of the Veterinary College. As soon as the nature and object of this institution were made known to him, he eagerly joined the scheme, urging the advantages which might be derived from it, not only as regarded the health of the useful quadrupeds, but as affording an additional means of advancing our knowledge both of Physiology and Pathology. Mr Hunter manifested his zeal for the cause, by allowing all the pupils of the College to attend his own lectures without expense.

Two years of the united labours of Mr Hunter, Sir E. Home, Mr Bell and Mr André, with their assistants, seem to have been devoted to the arrangement of the museum in the new hall in Leicester Square; and at the end of that period, Mr Hunter had the proud satisfaction of opening it to his friends and the public. The proofs of skill and assiduity displayed in this collection were contemplated by all with mingled admiration and surprise. It was exhibited twice a-year; in October to medical men, and in May to noblemen and gentlemen who were in town only at that season. This practice was continued till his death.

The short account of the museum by Sir E. Home is so interesting, and so fitted to prove useful to the naturalist, that we subjoin it in an Appendix. The collection already contained more than fourteen

thousand preparations, wet and dry, besides many fossils and shells.

We have still to add that Mr Hunter's hospitable mansion was open once a week for a social entertainment and conversazione, at which his scientific friends were always welcome, and where every thing new in science was introduced and discussed. His accomplished lady still continued to be the comfort and ornament of his home; and he was happy in two children, of whom he used to say, that if he had been allowed to bespeak a pair of children, they should have been those with which Providence had favoured him. Besides his house in town, he still retained his *propinquum rus*, a retreat every way calculated to soothe and delight, not less than to improve his leisure hours.

But in the midst of all his prosperity, Mr Hunter's health had become essentially impaired. The attacks of illness to which we have already had occasion to advert, proved, after a considerable interval, the precursors of others which finally terminated his laborious life. The case was considered very peculiar; and that inquisitiveness of mind which formed so conspicuous a trait of his character, was not dormant in regard to the nature of his own complaints. He noted the progress of the symptoms, and theorized upon them with his accustomed ingenuity. The medical men by whom he was surrounded, likewise watched and investigated every turn, so that

there are few cases, the history of which has been more fully recorded; a fact of which we cannot give a stronger proof, than by stating, that of the biography drawn up by Sir E. Home, more than a third part is occupied with this subject.

We do not of course enter into medical details, and only remark generally, that Mr Hunter was a very healthy man for the first forty years of his life, and with the exception of the threatening on the lungs, which was the ostensible cause of his going abroad, he had no complaint of any consequence during that period. After this, followed the attacks of 1773 and 1776, which we have formerly described, and which appeared to leave few if any unpleasant traces behind them. In 1785, he suffered a third attack, which was again brought on by anxiety of mind, and which, though slight at first, became more and more formidable, and was in truth the first of a series of painful spasmodic attacks, arising from disease of the heart, which at last terminated fatally. We avoid particulars, and only remark that the attacks were frequently attended with severe pain, and fits of swooning. Towards the commencement they were usually brought on by sudden exertion, but ere long they were induced by the most trifling causes.

Whenever his services were required, Sir E. Home was ready to act as his close attendant; his active assistant, and the general superintendent of his varied pursuits. Though the attacks gradually became more frequent, yet their violence did not in-

crease, but on the contrary considerably abated; and as Mr Hunter became more accustomed to their effects, less attention was paid to them. It is not to be supposed that Mr Hunter was permanently laid aside by this indisposition. Far from it. He bore up amidst its attacks with great firmness, pursued his round of duty with wonderful regularity, and was frequently the life, as he was the centre, of a numerous circle of admiring friends.

His disease, however, continued steadily to advance, and its reiterated attacks gradually shook his constitution, and occasionally affected his memory. The least degree of over-exertion, the excitement of company, or the slightest perturbation of temper, at last became sufficient to occasion an attack. As these increased upon him, Mr Hunter found it necessary successively to withdraw himself from his more laborious avocations, and to confine himself to a narrower range of duties and engagements; and every occasion of excitement was studiously avoided, as hazarding an attack of the most perilous nature.

An incautious neglect, or rather defiance of this precaution, proved the immediate occasion of his death. From circumstances which it would be tedious to explain, he had unfortunately differed with some of his colleagues at St George's Hospital, with whom he could not meet without the danger of a collision. From motives of humanity, however, to a young man, whom he conceived to be aggrieved

by certain new regulations of the Hospital, he resolved to attend at the Board, and run the certain risk of a violent trial of temper. On the morning of the Board day, he told a baronet who happened to call upon him, that he was going to the Hospital, that he was fearful some unpleasant rencontre might ensue, and if it did, he knew it must be his death. The event was too literally fulfilled. He went to the Hospital on the 16th October 1793, in his usual state of health. Meeting with things which irritated him, and not being perfectly master of the circumstances, he withheld his sentiments, and in this state of restraint went into the next room, where, turning round to Dr Robertson, one of the Physicians of the Hospital, he gave a deep groan, dropt down, and expired.

Mr Hunter was in his 65th year, the same age as that at which his brother died.

Such was the end of two brothers who had raised themselves to the highest celebrity by courses nearly similar, though distinguished by broad and characteristic marks of difference. In one remarkable point they both agreed, viz. that each left behind him a museum justly considered to be of national importance. Dr William bequeathed his Collection to the University of Glasgow, and Mr Hunter's was eventually purchased by Government. It was entrusted to the care of the Royal College of Surgeons of London, who celebrate Mr Hunter's birth-day,

by an annual festival, at which one of its most distinguished members pronounces THE HUNTERIAN ORATION.

We lament that justice to Mr Hunter's reputation forbids us to close our notice, without making some observations on a very painful subject, deeply involving the character of a near relative of Mr Hunter, who has frequently been named in these pages, and who long maintained a high and honourable status in society. We have stated that the museum was purchased by the British Government for the public benefit. By his will, Mr Hunter left Dr M. Baillie and Mr, afterwards Sir Everard, Home, his executors, with instructions, that if Government would make offer to purchase the collection at any thing like a fair valuation, the offer should be accepted. Accordingly the purchase was effected for the sum of L. 15,000; and subsequent grants were voted, one of an additional L. 15,000 in 1806, and another of L. 12,500 in 1810, for a building for its suitable accommodation.

At the time of Mr Hunter's death, as we have already seen, the Collection contained upwards of 14,000 preparations and drawings, and also what may well be styled a prodigious quantity of manuscripts, the great majority of which related to the museum, being voluminous notes in Mr Hunter's own handwriting, and also the labours of several amanuenses, who for many years had been in the habit of writing under his direction. As the pre-

mises of the College of Surgeons, in which the museum was eventually deposited, were not ready for its reception, it was not removed thither till the year 1800, and many years elapsed before it was in a state for exhibition. At the first transfer of the Collection, Sir Everard, who was then also appointed principal keeper of the Museum, ordered the manuscripts to be removed to his private dwelling, alleging they were not properly arranged, nor in a fit state for public inspection. No sooner was the museum suitably accommodated, than it became an object with the Trustees appointed by Government, to have a descriptive catalogue prepared, the materials of which were to be found in the manuscripts in Sir Everard's possession. The Trustees accordingly intimated their desires to Sir Everard, who for a long while evaded compliance, under a variety of pretexts, notwithstanding that for years the Trustees never met without dispatching an additional and more urgent demand. After having been long principal keeper, Sir Everard himself became a Trustee; but all the efforts of his colleagues, many of whom were his intimate friends, to procure the manuscripts, continued to be wholly abortive, till at last Sir Everard with his own hand secretly, but most deliberately, committed nearly the whole of them to the flames, and reduced them to ashes.

The motives which prompted to this most unworthy deed are soon told. Besides being the brother-in-law and pupil of Mr Hunter, to whom in a great degree

he owed his professional success; besides being selected by Mr Hunter as executor over that property which had absorbed his fortune, and to which, as the anticipated monument of his posthumous fame, he had devoted the indefatigable exertions of his life; besides being appointed to the honourable office of keeper of his relative's museum, and finally, one of its Trustees, for the public interest, Sir Everard, unfortunately for himself, determined at all risks to *become an author*. He was long one of the Vice-Presidents of the Royal Society, and one of its most unwearied and voluminous contributors, on subjects connected with Natural History; he was also a lecturer on Comparative Anatomy, and published, at various times, several splendid volumes on this most popular and captivating science; and the materials of these volumes and papers in the Philosophical Transactions, which astonished Europe, sometimes by their originality, and still more by their multiplicity, were clandestinely, and without acknowledgment, pilfered from Mr Hunter's manuscripts. It is impossible to conceive a more extraordinary infatuation. His base conduct was suspected at the time, and the fact of the spoliation, as well as the desperate resource to which he betook himself in order to destroy the means of his detection, have been irrefragably established before a Commission of Parliament. Thus, Mr Clift, the present unassuming and devoted keeper of the museum, long the assistant and friend of Sir Everard, being inter-

rogated by the Commission on Medical Education, answered, "That all his life he had been employed by Sir Everard in transcribing portions of Mr Hunter's manuscripts, and in copying drawings from his portfolios, which Sir Everard issued to the public as his own." And in 1823, the very week in which Sir Everard received from the printer the last proof of his last volume of Comparative Anatomy, when his career was well nigh run, it is established on his own testimony, that he proceeded to commit to the flames that treasury of science and research which he had so long plundered.

The irreparable loss which Mr Hunter's museum and the public have sustained by this deplorable transaction, will be judged of by the following quotation from the evidence of Mr Clift. "I cannot give an enumeration of half of the papers which were burned. Among those described, were nine folio volumes of Dissections of Animals; 1st, Ruminants; 2d, Animals *sine cæco;* 3d, Monkey and its gradations; 4th, Lion and its gradations; 5th, Scalpris Dentata; 6th, Anatomy of Birds; 7th, Of the Tricoilia; 8th Anatomy of Fishes; 9th, Anatomy of Insects; one volume on the Natural History of Vegetables. There were also a great number of fasciculi, among which were the following: Introduction to Natural History; numerous Physiological Observations; Comparative Physiology; Comparison between Man and the Monkey; On Muscular Motion, being subjects of the Croonian Lectures; Effects of

extracting one of the Ovaria upon the number of young produced; Experiments on Ewes, connected with Utero-gestation; On Monsters; On the Skeleton; Dissection of the Tapir; Dissection of the Armadillo with nine bands; Animals of New Holland; Piked Whale, Bottled-nose Whale, Fin-back Whale, and Porpoise; Worms in Animals of the Whale Tribe; Bell-barnacle; On the Eel; Anatomy of the Holothuria; Anatomy of the Siren of North America; Account of the Unicorn of Hispaniola; The Earth-worm; Progress and Peculiarities of the Chick; Description of Rymsdyk's Drawings of the Incubation of the Egg; General Observations on Insects, the Bee Tribe, Humble Bee, Wasp, Hornet, and on Beetles; Anatomy of the Silk-worm; Anatomy of the Moth; Red-piped Coral; On Fossil Bones, two parts; and numerous professional works."

Mr Hunter was rather below the middle stature, well formed for muscular action; his shoulders somewhat high, and standing slightly forward. He was naturally active, and capable of great exertion, bodily and mental. His features were somewhat hard, cheeks high, eyes small and light, and the bony arch prominent. His countenance upon the whole was open, and though strongly impressed with thought, was by no means habitually severe, but softened with tenderness, and sparkled with brilliancy, according to the impression of the moment. His remains were interred in a vault under St Martin's-in-the-Fields.

His temper was very warm and impatient, readily provoked, and when irritated not easily soothed. This is Sir Everard Home's account of it in his own words; and Mr Bell, who, from living so long with him, had equal opportunities of forming a judgment, entirely concurred in its accuracy. The keenness of his temper increased towards the latter period of his life; and it is evident that much must be attributed to the want of restraint in his youth, and much to the nature and severity of his disease.

His disposition was candid, and very free from reserve. He despised deceit, and perhaps incautiously avowed his sentiments. His mind was naturally formed for investigation, and he gratified that tendency even on the most trivial occasions. He soon tired in mixed company where there was no opportunity for connected conversation: and this was more particularly observable during the last ten years of his life.

Mr Hunter undoubtedly was one of the most industrious of men. The manner in which he appropriated his time, before infirmity impaired his exertions, was as follows: He rose very early in the morning, and went immediately into his preparation rooms, where he worked himself, and gave directions concerning what he would have done during the course of the day. After breakfast, which was at eight, he attended to those patients who came to the house. At eleven, he went abroad, and was employed in visiting the hospital and his patients. He

ate very sparingly at dinner, and rarely drank more than a glass of wine, often not that. In the evening he was engaged in writing down the observations he had made during the day; in preparing his lectures, or advancing his next forthcoming publication. He seldom retired to rest till twelve or one o'clock. He was thus seldom more than four hours in bed, but he usually indulged himself with a siesta for an hour after dinner.

He was eminently distinguished by his public spirit. He valued money no farther than as it enabled him to prosecute and extend his various and nearly endless researches. Hurried on by the ambition of benefiting mankind at large, he paid little attention to his own or his family's interests: and whether viewed in a professional light, or as a man of science, his zeal for his profession on the one hand, and for Natural History on the other, richly entitles him to the gratitude of posterity.

APPENDIX.

SIR E. HOME'S ACCOUNT OF THE HUNTERIAN MUSEUM, LONDON.

In this Collection we find an attempt to expose to view the gradations of nature, from the simplest state in which life is found to exist, up to the most perfect and complex of the animal creation—Man himself.

By the powers of his art, this collector has been enabled so to expose, preserved in spirits, or in a dried state, the different parts of animal bodies intended for similar uses, that the various links of the chain of perfection are readily followed, and may be clearly understood.

This collection of animal facts is arranged according to the subjects they are intended to illustrate, which are placed in the following order: 1st, Parts constructed for motion; 2d, Parts essential to animals, respecting their own internal economy; 3d, Parts superadded for purposes connected with external objects; 4th, Parts for the propagation of the species, and maintenance or support of the young.

The first class exhibits the sap of vegetables and the blood of animals, from which fluids all the dif-

ferent parts of the vegetable and animal creation are formed, supported, and increased.

These fluids being more and more compounded, as the vegetables and animals become more perfect, are coagulated, and form a regular series. The sap of many plants does not coagulate spontaneously, but is made to undergo this change by adding the extract of Goulard; the sap of such plants is considered as the most simple. In the onion there is a spontaneous coagulation. In insects the blood coagulates, but is without colour; in the amphibia colour is superadded. The moving powers of animals from the simple straight muscle, to the most complicated structure of that organ, with the different applications of elastic ligaments, form a second series. The growth of bone, horn, and shell, come next in order; and the joints, which admit of free motion, finish this subject.

The second class begins with those animals of the hydatid kind, which receive nourishment, like vegetables, from their external surface, having no mouth. Then follow those which are simply a bag or stomach, with one opening, as the polypus, having no organs of generation, as every part of the bag is endowed with that power. In the leech, the structure becomes more complex: for although the animal is composed of a bag with only one opening, the organs of generation, brain, and nerves, are superadded, and thence a gradual series is continued to those animals in which the stomach forms only a

distinct part of the animal, for the purpose of digestion. The stomachs themselves are also arranged in the order of their simplicity. First, the true membranous digesting stomach; then those with the addition of crops and other bags, to prepare the food for digestion, as in the ruminating animals; and lastly, those with gizzards. Annexed to the stomachs is a very complete and extensive series of teeth, which are varied according to the kind of food and stomach.

After the stomachs are the different appearances of the intestinal canal, which exhibit almost an infinite variety in the structure of their internal surface, from which the aliment is absorbed. The quantity of surface is increased in some by transverse folds, in some by spiral and longitudinal ones, and in others, puts on a loculated appearance, as in the whale.

To these are added the glands, connected with the intestines, as the liver, pancreas, spleen, which may properly be considered as appendages.

After digestion, follows the system of absorbing vessels, the simplest being the roots of plants; after which are the lymphatic and lacteal vessels of different animals. These in the human subjects and the elephant are small, and in the turtle large and more numerous; but in the spermaceti whale, where they are employed for conveying the spermaceti, of a size infinitely beyond all that is met with in any other animal. To these are annexed the thoracic ducts in different animals.

The natural order in following the course of the aliment from the stomach as a guide, leads from the absorbents to the heart, which in the caterpillar is a simple canal or artery running along the middle of the back, admitting of undulation of the blood. From this simple structure it becomes, in different animals, by small additions, more and more complex, till it arrives at the degree of perfection which is displayed in the human heart. These are followed by the different structures of valves in the arteries and veins, and the coats of these vessels. Then the lungs are shewn in all their gradations, from the simple vascular lining of the egg-shell, which serves as lungs for the chick, to those of the more perfect animals. In one instance, viz. that of the siren, both gills and lungs are seen in the same animal. The windpipe and larynx are then shewn, under all their different forms. The kidneys make the last part of this subject.

The third class takes up the most simple state of the brain, which is in the leech a single nerve with ramifications. In the snail, the brain forms a circular nerve, through the middle of which passes the œsophagus, from which circle there are branches going to every part of the skin of the animal. In the insect, the brain has a more compact form; is larger in fish, but still more so in birds, gradually increasing in size as the animal is endowed with a greater degree of sagacity, till at last it becomes the large complex organ found in the elephant, and in

the human subject. The coverings of the brain, and the ganglions, and peculiarities of the nerves, are annexed. The organs of sense are arranged in the order of their simplicity, beginning with that of touch, which is only a villous vascular surface, the villi very short, where the impression is to be made through a thin cuticle, or in the human finger; very long where the covering is thick, as in the hoof of the horse. The organ of taste is only a modification of the organ of touch, and therefore nothing in the organization is different; but the varieties in structure adapting the tongue for different purposes are numerous. In many animals it serves the purposes of a hand, to bring the food to the mouth, as in many shell-fish, the ant, bear, woodpecker, and chameleon. Connected with the tongue are the fauces, which in many animals have peculiarities. In the electric eel, they have a very curious carunculated appearance; but they are yet more extraordinary in the camel, which has an apparatus to moisten the parts, so as to prevent the painful sensation of thirst, thus adapting it to the sandy deserts which it is destined to inhabit. This apparatus consists of a large bag hanging down several inches in the fauces, and attached to the palate, which the animal can at pleasure move up and down, and lubricate the fauces. The organ of smell is variously constructed, and is more complicated in many animals than in man, as in the lion and sea-cow. The organ of hearing in fish consists of three semicircular canals, but is much more com-

plex in land animals. The organ of seeing is different in those animals which are formed to see in water, and in those which see in air; it differs again in those which are to see with little or much light; all those peculiarities are illustrated by preparations. The pigmentum nigrum in some fishes resembles polished silver; in ruminating animals, at the bottom of the eye it has a greenish hue; in the lion and cat kind, a portion of the bottom is white, but as a general principle, the colour of the pigmentum is the same as the rete mucosum of the skin of the animal, being white in white animals, and black in very dark ones.

After the brain and senses, are arranged the cellular membrane and animal oils, which are followed by the external coverings. These are divided into the different kinds, as hair, feathers, scales, &c., with the rete mucosum, or that membrane which is interposed between the true and scarf skin, for the purpose of giving the peculiar colour. Added to these are the parts peculiar to different animals for offence and defence, as spurs, hoofs, horns, stings, and also electric organs. There follow next such peculiar structures as occur in certain tribes of animals, as the air-bladders in fish, &c.

The fourth class begins with the animals which have no distinct parts allotted for generation, that power being diffused over the whole animal. In these the young grow out of the old, as in the coral and polypi; and next in order come the hermaphrodite

organs both of plants and of animals. The male organs are then taken up as a distinct subject, first in plants and then in animals, both at the times in which they do not breed, and in the breeding season, to shew their different states. To these are added a number of parts which answer secondary purposes in generation, and may be considered as appendages. The female organs are next exhibited in the maiden state, in every class of animals, demonstrating the shape and length of the oviducts, the form of the uterus, the length of its horns, with the varieties in their structures, and the instances in which these horns are entirely wanting, as in some monkeys; to which are added other peculiarities of structure. They are then exemplified in the impregnated state, beginning with the seeds of vegetables, and those which have both seeds and young shoots, as the onion. The eggs of insects follow next, with their changes, particularly the silk-worm. The spawn of fish are next shewn, first in those which have eggs, and then in those which have their eggs hatched in the oviducts, as the dogfish.

The arrangement then proceeds to the formation and incubation of the egg in the fowl, and the process of fœtation in the quadruped, with their peculiarities, and the different structures and appearances of the placenta. Added to these are the peculiarities of the fœtus, and the different modes by which the mother gives nourishment to her young.

Besides the preparations of the parts themselves

in spirits, in a dried state, or corroded, there is a considerable number of very valuable drawings of those subjects which could not well be preserved.

This sketch will give an idea, but a very inadequate one, of the system which is comprehended in Mr Hunter's collection. It also includes a very large series of whole animals in spirits, arranged according to their internal structure, and many of the most rare specimens of preserved animals in this country, as the cameleopard, guanaco, hippopotamus, tapir, argus-pheasant, &c. &c.

There is also a series of skulls of different animals, to shew their peculiarities: and skeletons of almost every known genus of animals. There is a large collection of shells and insects; a prodigious number of calculi of different sorts from the urinary and gall bladders, the stomach, and intestinal canal. There are also the most uncommon deviations from the natural structure, both in man and other animals: the most extraordinary specimens of this kind are a double human skull perfectly formed, the one upon the top of the other, and a double uterus, one portion of which is in the impregnated state. There is also one of the largest and most select collections of extraneous fossils that can be seen in this country.

RUMINATING ANIMALS.

Our first Volume devoted to these useful and interesting animals, was terminated by the description of a form of great elegance and beauty of colouring; and we have chosen to commence the present one with a series of animals, which begin to leave the elegant form of the Deer and Antelope, and to run into the more compact make of the Goats and Sheep. As we proposed in the commencement, we still continue the arrangement of Major Smith, as the best which has been hitherto proposed, and based upon actual observation in the greater number of instances. At the same time, we have to acknowledge the great benefit we have derived from his various writings upon the different groups of ruminants—materials which must form the groundwork of every dissertation on the subject, until our knowledge arrives at a much higher degree of perfection.

Since our first volume appeared, the new classification of animals by Mr Swainson has been published, where they are attempted to be arranged according to the principles of Mr MacLeay. Major Smith,

who is here also the groundwork of the portion devoted to the Ruminants, is followed nearly in his arrangement, with the exception that the Camels are placed as the ruminating form among the Solipedes, but of course in either position forming the passage between the two, and standing between the Cameleopards and the Horse. Mr Swainson makes the Bovidæ or Oxen typical, and names the other families Antelopes, Stags, Musks, Giraffes.* He also considers these animals as represented by the Rasores among birds, a position which has always appeared to us to be incontestible, but which is disputed by Mr MacLeay, who, if we recollect rightly, considers the Ruminantia and Grallatores or Waders as representing each other.

The animal we commence with will illustrate the Tragelaphine group of Major Smith; and, while it retains the elegance of the antelopine form, the horns will be seen to begin to assume an angular and compressed character;—on our Plate is represented

* At the conclusion of this volume we have given a table, the arrangement proposed by Mr Swainson.

PLATE I
J. Stewart del.t

THE HARNESSED ANTELOPE.

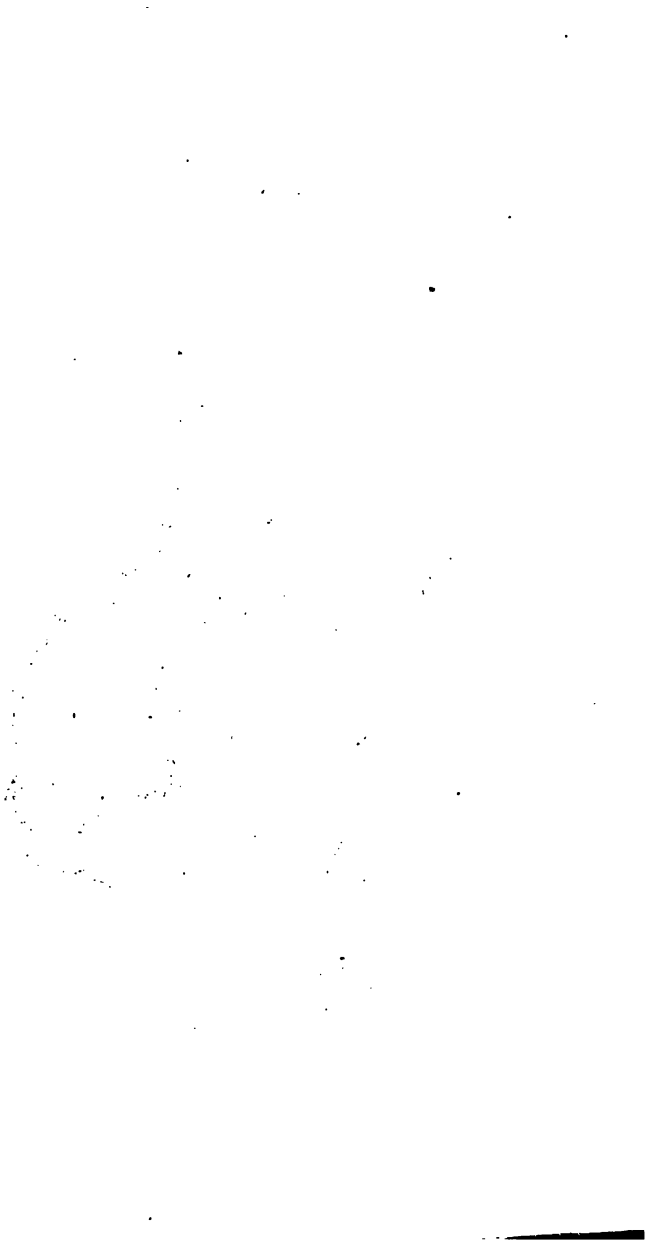
Tragelaphus scriptus, SMITH.

PLATE I.

Antilope scripta, *Pallas.*—Harnessed Antelope, *Pennant*, &c.—Tragelaphus scriptus, *Major Smith.*—Guib, femelle, *Fred. Cuv. Hist. Nat. des Mammifères.*

THIS is an animal of very great beauty, from the bright fulvous-bay which is the prevailing colour of the body, being marked or divided by longitudinal and transverse lines of white, which divide the ground colour into patches almost like those of the Cameleopard. The male is nearly of the size of the fallow deer, the horns black, and about seven inches long. For the accompanying representation, we have used the figure of Frederic Cuvier, which is a female, and regret that we have not been able to procure the observations of Lichtenstein in the Berlin Magazine. It appears to have been first noticed by Mr Adanson in Senegal, in the county of Podor, about sixty leagues inland from the sea. Lichtenstein says it inhabits Caffraria, but Mr Burchell did not meet with it; and, as far as we yet know, it is either very rare, or inhabits only those districts in the interior which

PLATE 7
THE CAMBING OOTAN.



THE CAMBING OOTAN.

Næmorhædus Sumatrensis, SMITH.

PLATE II.

Cambing Ootan, *Marsden.*—Cambtan, *Fred. Cuv. Hist. Nat. des Mammifères.*

SPECIMENS of this animal are yet uncommon, and almost all its later describers have been indebted to only imperfect materials. Mr Marsden was the first individual who noticed it, and for a long period remained almost the sole authority for the descriptions.

In 1821, Frederic Cuvier received drawings from MM. Diard and Duvancel, but without a detailed description. These were published in his Histoire Naturelle des Mammifères, which we have now made use of.

It is an animal standing from between 2 feet 2 inches to 2 feet 6 high. The hair on the head and body is entirely of a deep greyish-black, and is long. The neck and above the shoulders is covered with nearly white hair, also long, forming a sort of mane, and a strong contrast with the dark colours of the body. The suborbital sinus is very large, and secretes a yellowish liquid. The Cambing Ootan in-

habits the wooded mountains of Sumatra, exhibits much activity, and is very goat-like in its appearance and habits.

Major Smith refers the *Goral* of General Hardwicke to this division ;—a goat-like antelope inhabiting the Himalaya range and the mountains of the Nepaul frontier. The general tint is a grey mouse colour, but almost white about the lower part of the neck and throat ; and darker, with the hair longer, along the upper part of the neck and back, inclining to ferruginous about the legs. The horns are simple, *nearly connected* at the base, and about four and a half inches long. The height of the animal is about two feet. It is considered by the inhabitants of Nepaul as the most active of the antelopes, it is seen in numerous herds, but is rarely taken, except by stratagem ; if the herd is pursued, they disperse, and fly to precipices, and places to which no dogs can follow them.*

In the proceedings of the Zoological Society for August 1834, there is some information regarding this group communicated by Mr Hodgson. The centre of the horns is hollow and porous, and communicates with the frontal sinus, which are, however, small, while the core of the horns is only subcellular. The form is suited for heavy climbing or leaping. As the species of this group, he enumerates, 1. The animal we are now describing: 2. The *N.*

* General Hardwicke, in Trans. Linn. Soc. vol. xiv. p. 518.

Duvancellii, Smith, which he hints may be a variety of General Hardwicke's Goral: 3. The *Goral*, which he considers extremely goat-like in form, allied to the antelopes only by its round and ringed horns; and, 4. A new species, *N. Thar*, Hodgson, the Thar of the Nepalese, closely allied to the Cambing-ootan, and furnished with a suborbital sinus, which secretes a viscid humour, as in that animal. It is a large animal, standing about thirty-eight inches high, and weighing about 200 lb. The hair is scanty, harsh, and applied to the skin. The colour of the animal above, with the entire head and neck is jet-black, on the flanks mixed with deep clay-red. The limbs and hams outside, as far down as the great flexures, clay-red, nearly or wholly commixed; the rest of the limbs hoary, or rufescent hoary. Outsides of the ears dark. Chest pale. No stripes down the legs. Lips and chin dull hoary, and a stripe of pure hoary running backwards over the jaws from the gape. Horns, hoofs, and muzzle black.

It inhabits the precipitous and wooded mountains of the central region of Nepaul, up and down which it rushes with fearful rapidity, though it does not spring or leap well, nor is it speedy. *

The Rupricaprine group, consisting of a single animal, well known by name, "The Chamois," fol-

* Hodgson, Proceedings of the Zool. Soc. August 12. 1834.

lows this. It has no suborbital sinus, but possesses the inguinal pores, and the nose of the sheep. In form it resembles somewhat a slender formed goat, but is remarkable in the erect form of the horns suddenly bending at the tip to a hook, by which the animal might be suspended. It will be illustrated in the accompanying plate.

PLATE 3.

THE CHAMOIS.

Rupicapra vulgaris.

PLATE III.

Capra rupicapra, *Linn.*—Chamois, *Buffon, &c.—Fred. Cuv. Hist. Nat. des Mammifères.*

THE general form of the Chamois is that of a slender formed goat, with less shaggy hair, and marked by the peculiarly turned horns. It inhabits the alpine districts of Europe and Asia, holding an intermediate station between the elevated glaciers and the wild but more covered country somewhat below them, making excursions into both, and exhibiting amazing agility amidst the precipices of those fearful regions. Two varieties are mentioned, the Pyrenean, and those inhabiting the Persian Alps, the latter smaller, and of a paler colour, with the horns bending from the base. The general height of the European animal is two feet three or four inches, the horns black, round, and hooked backwards at the tips. The colour of the hair a yellowish or greyish-brown, with a black streak extending through the eyes. The Chamois is gregarious, living in herds of fifteen or twenty; they rut in October or No-

vember, and produce one or two kids early in the ensuing spring. They feed on the alpine pastures, which give a richness and flavour to their flesh, much esteemed as venison; and for this purpose, and the skins, do the hunters ply their often perilous employment, which carries them to places of the wildest and most precipitous description, and adds to the dangers in view, the terrors of an avalanche, or the giving way of some chasm, concealed, but slightly covered.

Few ravines, however, walled their sides, will stop this active animal: it will either scale or leap them. "We have seen it," says Major Smith, "leaping down a precipice, sliding first the fore legs down the steep, while, with the spurious hoofs of the hind feet, it held the edge of the rock with firmness, till the centre of gravity was lowered as far as possible, then bounding forward by a jerk of the body during descent, turn the croup under, and alight on the hind feet first, with such apparent ease, that the fore feet dropped close to the hinder, and all expression of effort vanished. These descents we have witnessed more than twelve feet, and it will not hesitate to leap down twenty, and even thirty." *

All the senses of the Chamois are extremely acute, and these, combined with its great agility, are the guards and defence from danger with which Providence has endowed this otherwise defenceless animal. The sense of smell, it is said, will enable

* Griffith's Cuvier, iv. 282.

it to perceive an aggressor at the distance of half a league. Its voice, when undisturbed, is a kind of low bleating, but, when alarmed, it is changed into a shrill blast or whistle, which is known to the herd, and at once sets them upon the alert.

As at the commencement of these volumes we proposed following the arrangement of the Ruminantia by Major Smith, we shall now proceed to his next forms, though, by later writers of authority and correct investigation, the species to be noticed has been placed with the Goats. The Aplocerine group of the above-mentioned author is represented by

THE WOOL-BEARING ANTELOPE.

Aplocerus lanigera.

PLATE IV.

Ovis montana, *Ord.*—Antilope lanigera, *Smith, Trans. Linn. Soc.* xiii.—Aplocerus lanigera, *Smith, in Griffith's Cuv.* —Capra Americana, Rocky Mountain Goat, *Richardson, Fauna Boreali-Americana*, pl. 22.

Major Smith considers this animal as approaching nearest to the ovine form, or that of the sheep. It has no lachrymal or inguinal sinus, and no muzzle, while the horns are apparently distinct from either the goat or sheep, being "simple, conical, obscurely annulated, the points bent back."

The interesting animal typical of this form was noticed so far back as 1697 by the Spanish missionaries, and, since that period, has been described by Blainville, Lewis and Clark, Ord, Major Smith, and, lastly, by Dr Richardson, whose trivial name we have adopted, and to whose description we shall now have recourse as the latest published.

This animal inhabits the north-west coast of America, frequenting the lofty peaks of the Rocky Mountains, and always keeping to a greater elevation than the sheep of the same regions; and Dr Richard-

PLATE 4.

J Stewart del.

WOOL BEARING ANTELOPE.

son thinks its range of distribution may be from the 40th to the 64th or 65th degree of latitude. The size of the animal is about that of an ordinary sheep, and a resemblance exists to the Merino breed, in the mode in which the fleece hangs down the sides. The ears are pointed. The horns are awl-shaped, sharp, pointed, and nearly erect, having but a slight curvature and inclination backwards; they are marked at the base with rings, which disappear about half-way up, and towards the tips they are remarkably even, smooth and polished, their surface throughout black and shining. The colour of the fleece is entirely white: it is composed of long straight hair, abundant on the shoulders, back, neck, and thighs, coarser than the wool of sheep, but finer than that of goats. The flesh is in little esteem as food. The Indians make caps and saddles of its skin.* The fleece, though thought by some to be available in our finer manufactures, has not yet been made use of or introduced.

* Richardson.

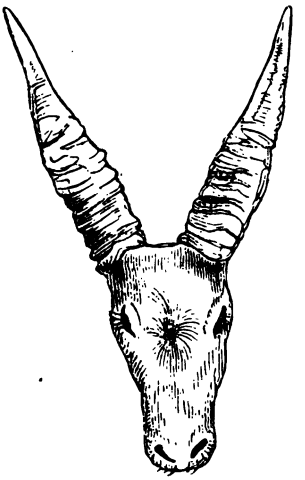
Two other doubtful or little known species are recorded, *A. mazama*, Smith, Ovine Antelope, inhabiting the rocky forests and mountains of tropical America; and *A. temmamazama*, Smith, The Chichiltic, inhabiting the mountains of New Mexico.

The last group among what has been considered the tribe of Antelopes, depends on the spoils of the animal only. It is the *Anoa* of Major Smith, distinguished from the preceding animals, by "the horns placed on the edge of the frontal crest, on the same plane with the face, exceedingly robust, a little depressed, subtriangular, short, straight, wrinkled, and suddenly terminating in a very sharp point; the face straight, no lachrymal or suborbital sinus."*

The head of this animal, which is all that exists in our collections (one in the British Museum, another, before its dispersion, in that of Mr Brooks), appear to have been brought from the Island of Cœlebs by Dr Abel. The horns gave the character above, as made out by Major Smith, and the forehead was covered with bluish-cinereous hairs, short and close and feathering beneath the left eye. The length from the nose to the base of the horns was nine in-

* Major Smith, in Griffith's Cuvier.

ches. The horns were ten inches long, and of a dark grey colour.*



* Mr Pennant placed the *Anoa* among the Buffaloes, and Mr Swainson has arranged it as the last of his Bovine family.

Genus CAPRA.

We have now arrived at those groups of the Ruminantia which are of most use to man in a state of civilization. Among the various forms, and curious and beautiful animals, which we have just been reviewing, we have seen many of very great importance to man; but the animals and their pursuers have been in nearly an equal state of unsubdued nature. The large deer of North America are an important article in the economy of the natives. Such is also the case with the native tribes of Africa in regard to the races of Antelopes; and the Rein-deer and Camel in their respective countries are indispensable for the commerce and support of their owners. The races of Goats, Sheep, and Oxen, which are now of such importance wherever man claims for himself the title of civilised, have been cultivated for his use, and by his care, since the commencement of the world. Among the first of mankind, keeping of sheep, and tilling of the ground, were the most common occupations; and that very circumstance of their early domestication, and the subjection to such varied circumstances, has made many changes and modifications of the forms,

which now renders the original stock of the various races of the utmost difficulty to determine.

The first of those which comes under our notice, though not so abundantly kept, formed in the primeval ages a large portion of the flocks in southern Europe, and more particularly in Asia and Egypt; and figures of goats of a large and strong race, but not very nearly approaching to the wild animals from which they are conjectured to have sprung, have been handed down upon monuments of an aged date. They are now used for their flesh and skins, and hair or wool. In this country the former is little esteemed, though kid forms no despicable repast. Gloves of a fine kind are made from the skins subjected to maceration, and the coats of it separated; and it is from goat skins that the real morocco leather is manufactured, being supposed to take the dye better than those of sheep. The hair or wool of one variety is well known as the source of the beautiful Cashmere manufacture.

In common language, the appellation of "goat" and "sheep" is applied to very different looking animals. The one, clothed in a fine thick covering, familiarly known as wool, with the horns, if any, bending laterally, and generally spirally; the other, covered with shaggy hair, a long beard, and the horns directed with a gradual bend upwards or backwards. When the different animals are, however, brought together, this generic distinction is not so easily perceived, and there is a running into each

other which has rendered the point of their separation disputed by various naturalists. We shall give the characters, however, placed to each by Major Smith, and consider, that, for the sake of simplicity, and ease of arrangement, they are best kept separate, even although Frederic Cuvier, a high authority, has said, that a better idea of the characters will be obtained by a figure than by a description, for that they have nothing in reality that can be expressed by language. It may be premised that they are distinguished from the true antelopes, "by the osseous nucleus of the horns being partially porous or cellular, communicating with the sinus of the frontals,"—a structure to which we saw an approach in the Cambing ootan of Sumatra. And Mr Hodgson adds to this, as a "strong and invariable distinction,—Males not odorous in the Sheep, as opposed to the males odorous in the genus Capra or Goat."* They inhabit alpine districts, often upon the limits of perpetual snow, are extremely active and sure footed, and climb with the greatest ease and security. They are at present known to inhabit Europe, Asia, and Africa—*Aplocerus* being the nearest approach to them in America.

Capra or *Goat*, Linn.—Horns common to both sexes, rarely wanting in the females; in domesticated races occasionally absent in both, directed upwards or depressed backwards, more or less angular and nodose. No muzzle, lachrymal sinus,

* Proceedings of Zool. Soc. Sept. 9. 1834.

or inguinal pores; tail short and naked at the base, chin bearded."*

Naturalists for a long time were of opinion that the original stock of our domestic goats was to be found in the Caucasian Ibex. The discovery, however, of another animal inhabiting the same country and the Asiatic border, more similar in form, has rendered it more probable that to that animal we are indebted for our present races, in some cases mixed with both the Caucasian and Abyssinian Ibex. The animal alluded to is

* Major Smith

THE ÆGAGRUS.

Capra ægagrus.—PALLAS.

PLATE V. MALE.—VI. FEMALE AND YOUNG.

Capra ægagrus, *Pallas, Ham. Smith, &c.*—L'egagre, *Fred. Cuv. Hist. Nat. des Mammifères.*—Le Passeng ou Bouc Sauvage, *Menagerie du Museum.*

THE Ægagrus appears first to have been noticed by Pallas and Gmelin, by whom descriptions were given, imperfect in the details of its habits. A figure, with descriptions, has been given in later days by the Baron Cuvier, in the Menagerie du Museum, from individuals captured on the European Alps, though Frederick Cuvier, in his Mammifères, seems to place a doubt on this fact, which it would be important to know, as Pallas surmised, that the species may be found on the European Alps, as well as the Caucasian and Asiatic ranges.

The male Ægagrus stands higher on its legs than the largest varieties of our goat, and the body is more slender. The limbs are strong and thick, and have not the light appearance of those of the antelopes or stags. The neck is short and thick, on account no doubt of the huge horns which it is

PLATE 5.

THE ÆGAGRUS – Male

PLATE 6.

THE ÆGAGRUS — Female & Young
Fred. Cuvier.

required to support. The head is not much lengthened, and the horns always bent backwards, are larger in proportion than those of any other known ruminant. The tail is very short, while the lower jaw is furnished with a lengthened beard. The head is carried high, the look is fixed, the movements rapid, and the whole carriage bold and easy. These are the appearances which at first strike an observer, but, on a narrower inspection, we perceive that the horns are of a triangular form, covered with transverse ridges. There is no lachrymal sinus. The nostrils are not placed in a naked muzzle. The face is covered with long and thick silky but loose hair, extremely soft.

Two specimens were possessed by the Parisian Menagerie; the one was of a greyish-brown, the other of a greyish-yellow colour. The last is represented in Fred. Cuvier's great work, and has served for our copy here. They lived for several years, and exhibited the same manners with the domestic goats.

EUROPEAN IBEX.

Capra Ibex.—LINNÆUS.

PLATE VII.

Ibex of the Ancients.—Capra ibex, *Linnæus. Ham. Smith in Griffith's Cuvier.*—Bouquetin des Pyrenées, *Fred. Cuv. Hist. Nat. des Mammif.*—Young Male.

THE European Ibex seems at the present time to be one of those animals which, though a native of a country where natural history is almost universally studied, has nearly escaped the detailed notice of zoologists, who have been more attentive to the productions of other countries, until the eagerness and perseverance of the Chamois and Ibex hunters have nearly extirpated the animal, and now rendered it a species earnestly sought after by collectors.

The Ibex is now known to inhabit sparingly, the Pyrenees, the Alps of Switzerland and the Tyrol, and some of the Spanish mountains. It loves to frequent the most exalted ranges, near the limits of perpetual snow, and seems in its common localities to ascend even higher than the chamois, which in other

THE EUROPEAN IBEX.

parts of its habits it closely resembles, being extremely watchful, and difficult of approach on account of the delicacy of its senses of hearing and smell. It is an animal standing from two feet six to two feet ten inches in height. The colour of its hair, like that of many of the deer, seems also to undergo a change with the seasons, being in summer of a reddish-brown, during winter of a greyish-brown, the inner parts of the legs and the belly being always whitish. A young animal figured by Fred. Cuvier is entirely of a greyish-brown, very dark above. The horns in this species are often very large, they rise from the crest of the skull and bend gradually backwards, are flat, and have the anterior surface ringed, with very strong cross rugged bands. These ridges are thought to become greater in number with age, but Major Smith is of opinion that a regular increase is not always to be depended on.

The Ibex was hunted for its flesh and skin, chiefly for the latter, and the chase was reckoned more arduous than even that of the chamois, for, independent of the difficulty and danger of the pursuit, the animals, when driven to extremity, would turn on their pursuers, and, if unable to pass, would attempt to butt with their powerful horns, and sometimes succeed in driving their adversary over tremendous precipices. In confinement it has been very seldom kept, so that little opportunity of observing its disposition has been afforded. The specimen above alluded to as kept in the Parisian Menagerie, was quiet and

dull, and did not exhibit that appearance of gaiety and frolicking so conspicuous in the young of both the goats and sheep. It was brought up by a she-goat, and though still remaining in company, appeared to exhibit no sign of attachment towards its foster mother.

Another Ibex is distinguished under the title of "Caucasian Ibex," *Capra Caucasica*. It is broader and shorter than the European species, dark brown above, white below, and, as its name imports, has been found on the Caucasian range of mountains.

A third species is introduced by Major Smith, under the name of the Abyssinian Ibex, a native of the mountains of Abyssinia and Upper Egypt, and on the shores of the Red Sea. It is said to stand higher than either of the foregoing species; "is of a dirty brownish fawn colour, with a short beard, and lengthened hair under the throat down the breast, and a darkish line on the anterior part of the legs and along the back. The horns are superior in length to those of the European Ibex, forming a half circle closer on the forehead." It will stand as the *C. Jaela*, Smith.

Another very beautiful goat, which seems entitled to the rank of a distinct species, is

JEMLAH GOAT.

THE JEMLAH GOAT.

Capra Jemlahica.—SMITH.

PLATE VIII.

The Jemlah Goat, Capra Jemlahica, *Smith in Griffith's Cuvier*, vol. iv. p. 308, and Synop.

OUR authority for this animal is the description and figure given by Major Smith, from a skin in the British Museum, and we of course use his own words in describing it. "The size of this animal appears nearly equal to the ibex. The facial line is straight, though the prominence of the horns give the forehead a concave appearance. The eyes are rather small, the ears short, narrow, and rounded at the tips. The horns stand obliquely on the frontals, rather high above the orbits, nearly in contact at the base, extremely depressed, almost flat, four inches and a quarter in breadth at the root, nine inches long, inclining outwards, then suddenly tapering to a point which turns inwards, so as to nearly meet over the neck. Their colour is pale ashy buff, the anterior edge marked with seven small protuberances, round, distinct, almost detached, shaped like drops, being gradually obliterated as they ascend,

and each marking the commencement of a wrinkle, which passes round the external flattened surfaces, in the forms of grooves, resembling the joints of a lobster, and being about four inches smooth where they contract to a point. The bones of the head are exceedingly solid and ponderous, without a void space on each side of the nasal bones, as in the case of the Caucasian Ibex and Ægagrus. The hair on the face and legs is short, mottled with a dark earthy coloured streak down the cheffron; that of the neck and back is very abundant, long and loose, with a stripe of the same sepia colour down the ridge of the spine. The tail is very short. On the sides of the cheeks the hair is exceedingly long and coarse, having, like a lion's, more on each side of the head, and feathering vertically also upon the shoulders; excepting the dark streaks above mentioned, and a darkish line on the anterior part of the legs, the whole animal is of a dirty whitish fawn, with a few locks of brown interspersed. It has no true beard, and the limbs are remarkably robust. It is said to inhabit the district of Jemlah, between the sources of the Sargew and Sampoo; that is the most elevated range of Central Asia, forming the nucleus between the western and south-eastern branches of the Himalayan mountains; it may therefore represent the ibex in the most lofty regions of the east beyond the Burrampooter, and extend into China."*

* Major Smith in Griffith's Cuvier.

A fifth species of goat has yet to be noticed, for which we are indebted to the researches of Mr Hodgson, who makes his observations from living specimens kept in his garden. It is

THE JAHRAL.

Capra Jahral—HODGSON.

It is closely allied by the characters of the horns to the Alpine Ægagri, and still more to the *C. Jemlahica* of our last plate. It differs from the former by the less volume of the horns, by their smooth anterior edge, and by the absence of a beard; from the latter, by the horns being much less compressed, not turned inwards at the point, nor nodose. The adult male is fifty inches in length from the snout to the rump, and thirty-three inches high. The head is finely formed, full of expression, clad in close short hair, and without the least vestige of a beard. The animal is of a compact and powerful make. The fur is of two sorts, the outer, hair of moderate harshness, neither wiry nor brittle, straight and applied to the skin, but irrigible under excitement, and of unequal length and colour; the inner, soft and woolly, as abundant as in the wild sheep, and finer, of one length and colour. The horns are nine inches long, inserted obliquely in the crest of the frontals, and touching at the base, with thin anterior edges, sub-

compressed, subtriangular, and uniformly wrinkled across, except near the tips, where they are rounded and smooth, peeled and sharpened towards the points, and obtusely rounded behind. The colour of the animal is a saturate brown superficially, but internally, heavy blue, and the mane for the most part, wholly of that hue. Fore arms, lower part of the horns, and back of the legs rusty, entire fronts of the limbs, and whole face and cheeks, blackish-brown, the dark colour on the two last parts divided by a longitudinal line of pale rufous, and another before the eye shorter. Lips and chin hairy, with a blackish patch on either side below the gape; tip of the tail and ears blackish, tongue, palate, and naked skin of the lips and muzzle, black. Iris deep reddish hazel.

The Jahral is found wild in the Kachan region of Nepaul, in small flocks or solitary. It is bold, capricious, wanton, eminently scansorial, pugnacious, and easily tamed and acclimated in foreign parts.*

Having thus noticed what are now esteemed as the distinct species of the Goat or genus *Capra* existing in a state of nature, we shall proceed to survey one or two of the principal breeds or varieties, some of which are very different from the animals we have been now describing, and seem almost to assume a distinct and continued breed, so that there is much difficulty in supposing them, as ever derived from any

* Hodgson, Proceedings of Zoological Society, part ii. p. 106.

of the wild animals. The common Goat, which is well known in the north of Scotland, and the most alpine counties of England and Wales, closely resembles the wild Ægagrus, and in some parts of the Highlands has become nearly naturalised, and scarcely to be approached except by stealth, or procured except by the assistance of the gun. We recollect once having a flock of this description pointed out to us on the precipitous side of Ben Nevis, and of endeavouring to get a shot in vain; their activity among the rocks surpassed any thing we could have imagined from description, and they had passed the rocky valley long before we had reached the station pointed out for an ambuscade. The goat is kept on account of its milk and the flesh of its young, the former being often in request as a medicine for persons of weak constitution or threatened with pulmonary complaints. They are frequently also kept about stable-yards as pets, where they become remarkably tame and attached, throwing off all the shyness and timidity which they exhibit naturally, and are ever prying and inquisitive. They are favourites with us; and an old he-goat, with full grown horns and an ample beard, always conveys an idea of something highly picturesque. A Welsh breed, generally of a white colour, is remarkable for its long hair and very large horns, which are sometimes three feet in length. In Holland, they are used in very pretty equipages for children, and we have seen two and sometimes four harnessed to a child's car, obeying the rein, and ap-

parently in complete subjection. As among the sheep, we have also a breed, white, and without horns, and here the distinction of the two forms is very close indeed, and scarcely to be distinguished except by the hairy fleece and indication of a beard. Many horned breeds also exist, and specimens with three and four horns are met with.

One of the most celebrated and important varieties of the Goat is

CASHMERE GOATS.
Edin R. H. Museum & Fred. Cuvier.

THE GOAT OF CASHMERE.

PLATE IX.

But even this is subject to many varieties, differing both in colour and in the quality of the wool, or rather the fine hair, of which the fleece is composed.

The principal points in the most approved breeds are large ears, the limbs slender and cleanly formed, the horns not spirally twisted, and above all, the fleece being long, straight, silky, and white. A specimen in the Edinburgh Museum agrees nearly in these particulars, and is represented on the accompanying plate, together with one of the varieties of the same race, which has been figured by Fred. Cuvier in his great work. The last varies only in the head and neck being of a very deep black. Besides the true Cashmere breed, from which originally the celebrated Cashmere shawls were made, there are several others which have been employed for the same purposes in different parts of India; and there is a Tartar half-breed, which has been found to survive well in a colder climate, and which has been introduced with considerable success into France. The most in request, however, are still brought from the kingdom of Cashmere.

Sixteen thousand looms are there supposed to be in constant motion, each giving employment to three men, and it is calculated that 30,000 shawls are disposed of annually. The wool of Thibet is thought to be the best. Twenty-four pounds weight of it sells at Cashmere, if of the best sort, for twenty rupees, but an inferior and harsher kind may be procured for half the money. The wool is spun by women, and afterwards coloured. When the shawl is made, it is carried to the custom-house and stamped, and a duty paid agreeably to its texture and value. The persons employed sit on a bench at the frame, sometimes four people at each, but if the shawl is a plain one, only two. A fine shawl with a pattern all over it, takes nearly a year in making; the borders are worked with wooden needles, having a separate needle for each colour. There is a headsman who superintends and distributes the pattern, and the rough part of the shawl is uppermost while it is manufactured.*

Two more grotesque looking goats, which have been generally placed as varieties of the domestic breeds, are represented grouped on the next plate, taken also from the figures of Fred. Cuvier. They are

* Tour in the Upper Provinces of Hindostan, by A. D. p. 187, 1823.

PLATE 10

GOATS OF NEPAUL & UPPER EGYPT.
Cuvier.

THE NEPAUL GOAT AND THE GOAT OF UPPER EGYPT.

PLATE X.

THESE two animals would almost seem not to be varieties, but distinct species, though perhaps there is not so much difference as we see in some of the races of the dogs; and this is one of those points in natural history which is extremely difficult to prove, even with the most extensive menageries and most favourable situations. The most marked characters in the black figure, the Nepaul Goat, is its high and slender figure. The arched form of the nose, occasioned by the convexity of the nasal bones; and the long and pendulous ears generally of a white colour, or paler than the tint of the body.

The other figure on the plate, the Goat of Upper Egypt, is generally of a brown colour, standing high, and somewhat of the form of the Nepaul Goat. The hair longer and more shaggy, the bones of the nose very much raised, and the appearance of the chin and face, with the exhibition of the teeth, putting one in mind of the *pugs* among dogs. The ears are also ample and pendent; from the neck there is frequently hanging two fleshy tubercles, an accessory

which is also sometimes seen in some of the breeds of sheep. In the female, the udder is always very pendent, sometimes almost touching the ground.

One of the prettiest breed of Goats is a dwarf variety, originally from Guinea, but now, according to Major Smith and Fred. Cuvier, multiplied in South America. Two of these animals are figured in the work of the latter naturalist, a male and female, prick-eared, but bearing very much in other respects a resemblance to the young or females of the common domestic breed. The horns are short, and bend backwards. The colour varies to the usual tints of the domestic races, and the forehead and nasal bones are rather concave. The height of the male was only twenty-two inches, that of the female about eighteen.

Genus OVIS.

From the Goats, so closely allied, we naturally pass to the generally accepted genus *Ovis* or Sheep, and as we proposed, we add Major Smith's character.

"Horns common to both sexes, sometimes wanting in the females. They are voluminous, more or less angular, transversely wrinkled, pale coloured, turned latterly in spiral directions, first towards the rear, vaginating upon a porous bony axis. The forehead and chaffron arched; they have no lachrymal sinus, no muzzle, no inguinal pores, no beard properly so called. The females have two mammæ; tail rather short, ears small, legs slender, hair of two kinds, one harder and close, the other woolly. In a domestic state, the wool predominates, the horns vary or disappear, the ear and tail lengthen, and several other characters undergo modifications. The genus is gregarious in the mountains of the four quarters of the globe."*

On comparing the above with the characters given to *Capra*, the differences will not be found to be very great, consisting chiefly in the form of the horns

* Major Smith in Griffith's Cuvier.

and in the presence of a beard, with sharp-pointed ears; and to these might be added the remark of an able naturalist, that the males of *Capra* are always very strongly odorous during the rutting season, while the reverse is the case with the sheep; and it is mentioned in the *Iconographia* of Bonaparte, as a characteristic mark, that Ovis or the True Sheep are always furnished with an interdigital hole, opening on the anterior part of each foot, and secreting a sebaceous substance. This, he remarks, is wanting not only in *Capra* but in every other ruminant. They are timid, defenceless, and of a more dependent character than the Goats.

The Sheep is certainly one of the animals which was first placed by the Divine Providence under subjection to man. From the earliest period of the world's history it has continued administering to the wants of almost all nations, and at the present time, is more extensively used in the human economy than any other animal. It is even sometimes employed in the less usual character of a beast of burden. Major Skinner relates in his excursions in India an instance of this fact.

"I met several merchants, natives of the province of Bisehur, returning from it, driving a flock of sheep, bearing loads from thirty-five to forty pounds each. The burdens were swung in bags over their backs, without any cords to bind them on, and they moved up the steep crags with the greatest nimbleness and indifference to the weight. It is very rare to find a

sheep a beast of burden; it is not uncommon however here. In this case, they were the bearers of their master's food, and were natives of the northern part of the mountains, a larger race than the common animals of the hills. They are used for trade, and are made to carry grain from a fertile to a less happy quarter. They travel with surprising quickness, and are kept together without the least trouble. No four-footed animals but goats and sheep could be used for such a purpose in any part of the mountains; and the former being too apt to roam, perhaps the latter are the only ones that could be safely turned to such account."*

Mr Wilson also remarks, on the authority of Dr Gillies, that in some of the districts of South America, the children use tame sheep as ponies, on which they ride to school.†

Four or five animals are now ranked as distinct species of sheep, one of which, at least, we find a native of each continent. In nearly every case the wild breeds are subjected, though they retain their outward characters, while the different cross breeds and cultivated varieties have been distributed to other provinces and continents; and there are few districts

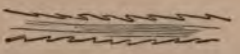
* Skinner's Excursions in India, 2d edit. vol. ii. p. 73.

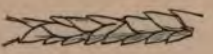
† Wood was formerly so scarce at Buenos Ayres, and cattle so plentiful, that sheep were actually driven into the furnaces of lime kilns, in order to answer the purposes of fuel. A decree of the king of Spain, prohibiting this barbarous custom, still exists.—*History of Fossil Fuel and Coal Trade of Britain.*

in the world, if we except the extreme poles, which have not some breed of this useful animal carefully watched and tended; and even in those regions so remarkable for the want of Ruminantia and all large animals, they have been introduced, and are becoming of the utmost importance in the commerce of the colonies. In a wild state, they are all gregarious, watchful, defenceless, and extremely timid. They inhabit mountainous countries, and though possessing less activity than the goat, climb rocks and precipices with facility and speed, few hunters being able to come up with them if once alarmed. Their fleece, in their wild state, approaches nearer to hair than wool, or at least the wool is short, and forms the under covering, and is plentifully mixed with long and coarser hair. In the Rocky Mountain sheep, again, the fleece has the character of the hair of the deer, being strong and crispy, and having the woolly part of the coat quite concealed, being short but very thick.

In the frequent mention of the terms wool and hair, as partly characterizing the Goat and Sheep, it may be proper to notice their distinction. In a very great many animals the fur is composed of two substances, the one long and appearing outwardly, the other short and thick, and occupying the part next the skin. The lower covering has received the name of wool, and the getting rid of the long portion, or the hairs, is termed the "improvement of the fleece." The under or woolly part possesses a qua-

lity decidedly characterizing it, its tendency to *Felt*, produced by its structure, the edges appearing serrated, and the surface imbricated, when viewed under





a strong magnifying power, while hair is always cylindrical. An examination of the minute structure of the coverings of animals is yet much to be desired, and it will without doubt throw much additional light upon their properties.

Although attempts have been made to trace the stock of our breeds and varieties, it is a subject which has never been done to the satisfaction of the writers themselves, and one on which it will perhaps be impossible to come to an accurate decision. The Musmon of Corsica, and the Asiatic Argali, although there are some discrepancies between the skeletons of these animals and the domestic races, have generally been considered as the most probable origin, the appearance being also nearest to that of some of the breeds; and as we pursued the same plan when speaking of the goats, we shall notice these animals, and one or two of the others, before mentioning some of the principal and best breeds, or more singular varieties. And first,

THE MUSMON OF CORSICA.

Ovis Musmon.

PLATE XI.

Musmon of *Pliny*.—Mufflon, *Buffon, Cuvier, Fred. Cuvier. Hist. des Mammif.*—Ovis Musmon, *Hamilt. Smith.*—Capra Musmon, Ariete Muffione, *Bonaparte, Iconographia.*

THIS Sheep, now, we may say, so comparatively little known, inhabits the mountainous wilds of Corsica and Sardinia, and has there only to contend against man as its enemy, no large carnivorous animal existing which would carry destruction among its herds; and it is to this circumstance probably that these inlands are indebted to the remnants of the flocks which appear to have formerly existed among the mountains of Spain, and some neighbouring parts of the Continent of Europe.

We have chosen to extract the description which the Prince of Musignano has given in his erudite and highly finished *Iconographia*, as one of the latest, and, as far as we can judge, most authentic. In 1818, there were living specimens in the Parisian

PLATE II.

THE CORSICAN MUSMON.
Cuvier.

menagerie, taken when young in Corsica. They reached the ordinary size of sheep, and bred with the domestic races. They became completely domesticated, losing their great timidity; and the males would even attack their keeper. They were extremely hardy, and required little care, and their senses of hearing and sight, particularly the former, were very acute.

By the Prince of Musignano, the Musmon is placed in the genus or subgenus *Capra*, on account of the absence of the interdigital glandular hole: he has thus described it: "The head is long, with the muzzle compressed, the nose is somewhat raised. There is a trace of a lachrymal sinus: the forehead is swollen; the ears moderately large, erect, sharp. The horns of the males are large and long, triangular, bending with an arch which constitutes more than half a circle. Their bases are so extended that they occupy almost all the forehead, and are separated only by a small space. They are attenuated almost uniformly from the base to the tip, which is obtuse; and for the whole length they are marked with transverse wrinkles, and with raised rings.

The chin is without a beard: the neck is of a moderate size, with the appearance of a dewlap beneath. The body is large and muscular; the tail very short, composed only of twelve vertebræ (whereas in the domestic sheep there are nineteen or twenty), inflexed, bare on the under side. The legs are pretty long, the hoofs short.

The general tint of the body is a yellow, tending to chestnut or ash colour, deepest on the neck, and clear on several parts of the back and lumbar regions. The head is ash-grey: the muzzle more or less approaching to pure white, which colour occupies also the region of the eyes, the interior of the ears, the belly and inside of the thighs, the edges of the tail, and the extremity of the legs. A band of ill-defined brown stretches along the back to the upper part of the tail. The horns are brown, tending to ochraceous. All the fleece owes its tints to the long hair, which exceeds the woolly part in length. In the parts more intensely coloured, the hair is of a deep yellow, black, or black and yellow, in different proportions, according to the different parts they clothe. The curled hair which constitutes the wool properly so called, is of an ash colour or rusty white.

In winter, all the hair is thicker, more inclining to chestnut on the coloured parts. The line along the back is blackish, especially upon the shoulders. In some specimens, the tints, notwithstanding the seasons, are all pale or whitish.

The female is constantly distinguished from the male by the want of horns; but we have seen individuals furnished with them, though only one or two inches long. The young are generally of a paler yellow.

It inhabits the highest peaks and desert places of the mountains in the various provinces of southern Spain, in Sardinia and Corsica, European Turkey,

in some of the islands of the Archipelago, and in the isle of Cyprus. The flocks consist sometimes of a hundred and more, placed under the guidance of some old and courageous male. In a domestic state, the young males and females are docile and gentle; but the old males become subject to ill-natured fits, and sometimes assail children, women, and even men, attempting to bear them down by butting.

Mr Hodgson has lately noticed an animal from the Nepalese territory, under the title of *Ovis Nahoor*, but which he at the same time acknowledges to be very closely allied to the Musmon, and most probably to be only a variety of it. The adult is about forty-eight inches in length, and thirty-two high; the head coarse and expressionless, and clad with close short hair; the chaffron considerably arched. The fur is of two sorts: the outer hair of a harsh, brittle, quill-like character, serpentined internally with salient bows of hair fitting into the resilient bends of one another; externally straight, porrect over the skin, and being abundant, of medial uniform length all over the body: the inner coat soft and woolly, rather spare. Horns twenty-two inches along the curve: they diverge greatly, but can scarcely be said to be spirally turned; they are uncompressed, triangular, broadly convexed to the front, and cultrated to the back; they are transversely

wrinkled, except near the tips, which are smooth and round.

The colour of the animal is a pale slaty-blue, obscured with earthy-brown, in summer overlaid with a rufous tint. Head below, and inside of the limbs and hams, yellowish-white, edge of the buttocks behind, and of the tail, pure white; face, parts of the limbs and chest, blackish; bands on the flanks the same, and also the tip of the tail.

It is found in the wild state in the Kachar region of Nepaul, amid the glaciers of the Himalaya, and both on the Indian and Thibetian sides of the snowy crests of that range, and is sufficiently bold and scandent, but far less pugnacious, capricious and curious than the Jharal or goat formerly noticed. The female has the chaffron straight, the horns erect,* subrecurved, and greatly depressed. The young want the marks on the limbs and flanks.

It differs from the Musmon by the decided double flexure of the horns, their presence in the females, and the want of a tuft beneath the throat. †

* P. 117.

† Hodgson, Proceedings of the Zoological Society, September 9. 1833.

The ASIATIC ARGALI is another animal from which some of the eastern races of sheep may have sprung. It is a very large and powerful creature, inhabits the highest mountain-ranges of Asia; Caucasus, and the plains of Siberia, and the flesh is much esteemed, while in Russia the skins are still used as articles of dress. They are extremely wild and watchful, but, when taken, are easily domesticated. The males are said sometimes to reach a weight of 200 lb., and to stand about three feet high at the shoulder. The horns are of an immense size, weighing 30 lb., and reaching four feet in length. Altogether it must be a noble animal, approaching the dimensions of a stag rather than according with our ideas of the bulk of our sheep. The fur is short, fulvous-grey in winter, with a ferruginous, buff-coloured streak along the back, and a disk of whitish-brown on the buttocks. During summer, the tints of the fur are more rufous. It will stand as the *Ovis ammon* of our systems. *

There is also an animal inhabiting the mountains of northern Africa, in a wild state, which may have some claim to assistance in producing our present breeds: it has been considered in the light of a species, and distinct from any of those we have been noticing. It is

* Major Smith.

THE BEARDED ARGALI.

Ovis tragelaphus.—Caius?

PLATE XII.

Tragelaphus, *Caius?*—Mouflon d'Afrique, *Geoffroy, Mem. de l'Institute d'Egypte.*—The Bearded Argali, *Hamilton Smith.*

There is an uncertainty in the history of this animal. The older writers, to whom we have referred in the synonyms, on the authority of Major Smith, state it to be a very large animal, of a dark colour, maned, and with lengthened hairs on the dewlap; but the sheep represented on the accompanying plate, supposed to be a variety, allowing something for age and exaggeration in the old describers, was discovered by the naturalists attached to the Egyptian expedition on the mountains of that country, and is figured in the great work on Egypt, one of the most remarkable publications for its splendour in existence. We have copied the figure, and it is described in the following terms:

"Under the general name of Mouflon, are included all kinds of wild sheep; and the term is likewise used with a more restricted application, to in-

THE BEARDED ARGALI
Denon.

dicate particular species. Thus, we have the Mouflon of Corsica, and the Mouflon of America, &c. The species, of which a figure is annexed, is the Ruffled Mouflon: and the following exact description of it has been communicated to us by our friend M. J. G. St Hilaire, who drew it up from an individual brought from Egypt by his father, and preserved in the collection of the Museum of Natural History in Paris.

" The Ruffled Mouflon *(Ovis ornata)* is uniformly of a fine reddish-yellow, thus approaching in its general colour to our own species. The shade, however, is lighter than in the European animal, because the yellow hairs are not intermingled with black ones, but, on the contrary, they are even white at the point, a circumstance which gives the hair a dotted appearance when viewed near at hand. The colour just mentioned is that of the body, head, and greater part of the legs; but the anterior part of the shanks and the dorsal line are of a brownish tint, and on the medial line, between the two legs, a black longitudinal stripe is observable. Lastly, the under side of the body, as well as the internal and inferior regions of the legs, are of a white colour, as in our own species; always, however, with this difference, that the white portion of the body is of much less extent than in the latter. But the most singular character which this species presents, and which has procured it the French name of Mouflon à manchettes, is the long hairs which garnish the anterior

parts of its body and legs. Hairs, from six to seven inches long, spring from the three lower quarters of the thigh, as far as the shank, on the anterior, posterior, and external sides, and hang down as far as the middle of the shank, thus forming a very remarkable kind of ornamental appendage. Besides this, a tuft of long hairs, from two to three or four inches in length, rises from each side, near the angle of the jaw; and a little below this, commences a band of hairs, running along the medial line, which is continued to the lower part of the neck, where it is divided into two branches, which terminate near the articulation of the tibia with the thigh. A little before the place where they bifurcate, these hairs are from a foot to thirteen inches long; but towards the extremity of the neck and shoulder they are much shorter, not exceeding half a foot. Their colour is generally the same as that of the body, but those which are placed near the interior side of the thigh and shank, are brownish, and a line of the latter colour is observable on the anterior part of the neck.

"This animal which is a fifth part larger than the European species, has the tail about seven inches long, and terminating in a pencil of hairs. The horns appear small in proportion to the size of the body, and, in the specimen preserved in the Museum, they are not larger than those of our own Mouflon, although the individual in question is a male, and seems full grown. These appendages present some peculiar characters besides those just

mentioned: they are very different in shape from those of the common Mouflon, and their base is rather quadrangular than triangular; they have no salient angle, especially towards the base, and the extremity, which is directed inwards (contrary to what is observed in the other species) is scarcely dilated, but forms a true point, in the sense usually attached to that word. The wrinkles are faintly marked, unless it be near the head, and the extremity is almost wholly smooth. As in the other species, the horns approximate very closely on the forehead, and at one point they are almost contingent: the angle which they enclose is much less acute than in our Mouflon, being not more than about 60°. Finally, they are as broad at the base as in this species; but their circumference is more considerable, on account of the augmentation of surface resulting from their quadrangular shape.

"In some descriptions, this beautiful animal bears the name of African Mouflon. It is not yet certainly determined whether it ought to be referred to the bearded sheep of Pennant, the description given by that author being too incomplete to enable us to speak decisively about its specific identity. MM. Cuvier and Desmarest, however, have admitted it, and united these two species, under the name of *Ovis tragelaphus*. The Mouflon à manchettes of M. G. St Hilaire was killed near the city of Cairo; but it is uncertain whether that part of Egypt be the place of its habitual residence."

THE AMERICAN ARGALI, OR ROCKY MOUNTAIN SHEEP.

Ovis montana.—DESMAREST.

PLATE XIII.

Big-Horn, *Lewis and Clark.*—The Argali, *Cook.*—Mouflon d'Amerique, *Desmarest.*—Ovis montana, Rocky Mountain Sheep, *Richards. Faun. Bor. Americana.*

To the numerous travellers who have attempted to explore the northern parts of America, this animal seems to have been reported (and is sometimes mentioned by themselves), under the denomination of sheep, goats, and deer; and no description bearing any stamp of authenticity appears to have been made public, until the appearance of a paper in America by Mr Macgillivray, which attracted the attention of the naturalists of Europe; and the same specimen which furnished that description being sent to M. Geoffroy, a figure appeared in the Annales du Museum. During the late journeys of Mr Drummond and Dr Richardson, many specimens have been both seen and shot, and sent to the collections in Britain; and the Fauna Boreali-Americana of Dr Richardson contains the latest and best figure and description,

ROCKY MOUNTAIN SHEEP. Male & Female.
Edin. R.U. Museum.

the latter drawn up from recent specimens, and the notes made in Arctic America. These we now use, and for our illustration have had recourse to a magnificent ram which has been lately added to the Edinburgh Museum.*

"The Rocky Mountain sheep inhabit the lofty chain of mountains, from whence they derive their name, from its northern termination in lat. 68° to about lat. 40°, and most likely still farther south. They also frequent the elevated and craggy ridges with which the country between the great mountain range and the Pacific is intersected; but they do not appear to have advanced farther to the eastward than the declivity of the Rocky Mountains, nor are they found in any of the hilly tracts near to Hudson's Bay. They collect in flocks, consisting of from three to thirty, the young rams and the females herding together during the winter and spring, while the old rams form separate flocks, except during the month of December, which is their rutting season. The ewes bring forth in June or July, and then retire with their lambs to the most inaccessible heights. Mr Drummond informs me that in the retired parts of the mountains where the hunters had seldom penetrated, he found no difficulty in approaching the Rocky Mountain sheep, which there exhibited the simplicity of character so remarkable in the domestic species; but where they had been often fired at,

* Received from the Colombia River, from Dr Gairdner.—*Edinburgh New Philosophical Journal*, Jan. 1836.

they were exceedingly wild, alarmed their companions on the approach of danger by a hissing noise, and scaled the rocks with a speed and agility which baffled pursuit. Their favourite feeding-places are grassy knolls, skirted by craggy rocks, to which they can retreat when pursued by dogs or wolves. They are accustomed to pay daily visits to certain caves in the mountains, that are encrusted with a saline efflorescence of which they are fond. The horns of the old rams attain a size so enormous, and curve so much forwards and downwards, that they effectually prevent the animal from feeding on level ground. The flesh is quite delicious when in season, far superior to that of any of the deer which frequent the same quarter, and even exceeding in flavour the finest English mutton." *

In 1818, Professor Jameson presented a skin of the Rocky Mountain sheep to the Wernerian Society of Edinburgh, and recommended an attempt to be made for its introduction to this country. For this purpose, a committee was appointed to confer with the Directors of the Highland Society, and Mr Thomas Laurie (the eminent land-valuator) was requested to give in a report regarding the value of the fleece. We have thought that gentleman's remarks upon the wool worthy of insertion:—" The wool, which forms the chief covering of the skin, is fully an inch and a half long, and is of the very finest quality. It is unlike the fleece of the common sheep,

* Fauna Boreali-Americana, i. p. 271.

which contains a variety of different kinds, suitable to the fabrication of articles very dissimilar in their nature, and requires much care to distribute them in their proper order. The fleece under consideration is wholly fine. That on the fore part of the skin has all the apparent qualities of fine *wool*. On the back part it very much resembles *cotton*. The whole fleece is much mixed with hairs; and, on those parts where the hairs are long and pendant, there is almost no wool.

"The wool, if separated from the hairs, would, I think, be adapted for the finest purposes of manufacture. But, in its present state, it could not be so applied, though many of the hairs would fly off in the manufacturing processes. It is, however, highly probable, that, by a careful selection of breeding stock, the hairs might, in a great measure, or perhaps entirely, disappear in the course of a very few generations. It has always been observed, that where sheep have been neglected, their wool has been comparatively coarse; and wherever they have been properly treated, and due advantage taken of the accidental finer varieties, the quality of their wool has been proportionally ameliorated. Indeed, the improvement in the qualities of the wool has uniformly been marked as keeping pace with the progress of arts and civilization. I am therefore of opinion, that the wool of the Rocky Mountain sheep would soon become a great acquisition to the manufacturers of this country, were the animal which yields it to experience the

judicious treatment of many British flocks; and there can be no doubt, that such an experiment would be well worth trying. Under this impression, I cannot help expressing a wish, that the Society, to whose consideration these remarks are submitted, would exert their influence for accomplishing an object which may prove of national importance."*

In the specimen which we have figured, the external coat consists entirely of the hair, which Mr Laurie alludes to as unfit for purposes of manufacture, forming a dense and deer-like covering, but at the root of this there is abundance of very close, fine, but short wool, which would be unattainable for any purpose, unless the hairs could be got rid of by the influence of a milder climate, and improvement or change of the breed.

The specimen in the Edinburgh Museum stands three feet two inches high at the shoulder, and is in length about three feet five inches. The general colour is a pale opaque wood-brown, having a peculiar dull tint. The lower parts are paler, nearly white, and the buttocks are marked with the pale dusk of the deer. The horns are large, about thirty-one inches long, and fifteen and a half inches in circumference at the base. Dr Richardson remarks that the old rams are nearly entirely white in the spring, occasioned by the rubbing or wearing of the hair, which is coloured only at the tips. We are

* Wern. Trans. vol. iii. p. 310.

not aware of this species having been domesticated in America, or imported alive to Europe, and we believe that no domestic breeds are at this time traced to it.

We now come to review some of the more remarkable of the domestic races, but if all the varieties were to be described, much more than the proper proportion of our space would be occupied, and on that account one or two only of these from each continent will be noticed. It may be premised, that writers have generally placed all the varieties under the denomination of *Ovis aries*, though it is generally acknowledged that it is from some one of those we have been now describing that they are derived. Among the European races with which we shall commence, by far the most important, as far as regards the texture of the wool, is the Merino, though, if we shall look to a combination of advantages, some of the British breeds will surpass it in value; while by crossing, the hardier nature has been transferred, and the produce of a wool of equal quality, but nearly double in quantity, has been yielded by some of them. The sheep known by the name of the Ryeland breed has been most successful in Britain under this kind of management.

To the Merino breed, *Ovis hispanica* has been applied, and, as the name implies, is chiefly culti-

vated in Spain. It is distinguished from the British breeds, by bearing wool on the forehead and cheeks. The horns are very large and ponderous, and convoluted laterally. The wool is fine, long, soft, and twisted, in silky-looking spiral ringlets, and having a large proportion of natural oil, to which the dust and other impurities adhere, gives a dingy and unclean appearance to the animal, which conveys an idea of inferiority, but which is immediately removed when the unsullied pureness and fineness of the wool is seen on separating it. The make of the Merino is not so symmetrical as some of our British breeds, and there is a loose skin hanging from the neck, which detracts from its appearance. Many different breeds exist, but the best is supposed to be those of Cavague and Negrote. These are kept during the winter in particular districts of milder climate, and are travelled to other districts to be shorn, and again removed to the most favourable grazing stations. The Pyrenean races are rather more hardy, but yield a remarkably fine wool; they are cultivated to a great extent, and in a particular manner, which we find detailed by Mr Young in the Annals of Agriculture:

"On the northern ridge, bearing to the west, are the pastures of the Spanish flocks. This ridge is not, however, the whole; there are two other mountains quite in a different situation, and the sheep travel from one to another as the pasturage is short or plentiful. I examined the soil of these mountain

pastures, and found it in general stony; what in the west of England would be called a *stone-brash*, with some mixture of loam, and in a few places a little peaty. The plants are many of them untouched by the sheep; many ferns, narcissus, violets, &c.; but burnet (*Poterium sanguisorba*), and the narrow-leaved plantain (*Plantago lanceolata*), were eaten, as may be supposed, close. I looked for trefoils, but found scarcely any. It was very apparent that soil and peculiarity of herbage had little to do in rendering these heights proper for sheep. In the northern parts of Europe, the tops of mountains half the height of these (for we were above snow in July) are bogs; all are so which I have seen in our islands; or, at least, the proportion of dry land is very trifling to that which is extremely wet. Here they are in general very dry. Now, a great range of dry land, let the plants be what they may, will in every country suit sheep. The flock is brought every night to one spot, which is situate at the end of the valley on the river I have mentioned; and near the port or passage of Picada, it is a level spot, sheltered from all winds. The soil is eight or nine inches deep of old dung, not at all enclosed: from the freedom from wood all around, it seems to be chosen partly for safety against wolves and bears. Near it is a very large stone, or rather rock, fallen from the mountain. This the shepherds have taken for a shelter, and have built a hut against it: their beds are sheep-skins, and their doors so small that they crawl in. I

saw no place for fire, but they have it, since they dress here the flesh of their sheep, and in the night sometimes keep off the bears by whirling firebrands: four of them, belonging to the flock mentioned above, lie here. I viewed their flock very carefully, and, by means of our guide and interpreter, made some inquiries of the shepherds, which they answered readily and very civilly. A Spaniard at Venesque, a city in the Pyrenees, gives 600 livres French (the livre is 10½d. English) a-year for the pasturage of this flock of 2000 sheep. In the winter he sends them into the lower part of Catalonia, a journey of twelve or thirteen days; and when the snow is melted in the spring, they are conducted back again. They are the whole year kept in motion, and moving from spot to spot, which is owing to the great range they everywhere have of pasture. They are always in the open air, never housed or under cover, and never taste of any food but what they can find on the hills.

"Four shepherds, and from four to six large Spanish dogs, have the care of this flock: the latter are in France called of the Pyrenees breed; they are black and white, of the size of a large wolf, a large head and neck, armed with collars stuck with iron spikes. No wolf can stand against them; but bears are more potent adversaries; if a bear can reach a tree, he is safe; he rises on his hind legs with his back to the tree, and sets the dogs at defiance. In the night the shepherds rely entirely on their dogs;

but, on hearing them bark, are ready with fire-arms, as the dogs rarely bark if a bear is not at hand. I was surprised to find that they are fed only with bread and milk. The head shepherd is paid 120 livres a-year wages, and bread; the others 80 livres, and bread; but they are allowed to keep goats, of which they have many, which they milk every day. Their food is milk and bread, except the flesh of such sheep or lambs as accidents give them. The head shepherd keeps on the mountain top, or an elevated spot, from whence he can the better see around, while the flock browses the declivities. In doing this, the sheep are exposed to great danger in places that are stony; for, by walking among the rocks, and especially the goats, they move the stones, which rolling down the hills, acquire an accelarated force, enough to knock a man down, and sheep are often killed by them; yet we saw how alert they were to avoid such stones, and cautiously on their guard against them. I examined the sheep attentively. They are in general polled, but some have horns, which, in the rams, turn backwards behind the ears, and project half a circle forward: the ewes' horns turn also behind the ears, but do not project; the legs white or reddish; speckled faces, some white, some reddish; they would weigh fat, I reckon on an average, from 15 lb. to 18 lb. a quarter; some tails short, some left long. A few black sheep among them; some with a very little tuft of wool on their foreheads. On the whole, they resemble those on

the South Downs; their legs are as short as those of that breed,—a point which merits observation, as they travel so much, and so well. Their shape is very good; round ribs, and flat straight backs; and would be with us reckoned handsome sheep, all in good order and flesh. In order to be still better acquainted with them, I desired one of the shepherds to catch a ram for me to feel, and examine the wool, which I found very thick and good, of the carding sort, as may be supposed. I took a specimen of it, and also of a hoggit or lamb of last year. In regard to the mellow softness under the skin, which, in Mr Bakewell's opinion, is a strong indication of a good breed, with a disposition to fatten, he had it in a much superior degree to many of our English breeds, to the full as much so as the South Downs, which are for that part the best short-woolled sheep which I know in England. The fleece was on his back, and weighed, as I guessed, about 8 lb. English; but the average, they say, of the flock is from 4 to 5, as I calculated by reducing the Catalonian pound of 12 ounces to ours of 16, and is all sold to the French at 30s. the pound French. This ram had the wool of the back part of his neck tied close, and the upper tuft had a second knot by way of ornament; nor do they ever shear this part of the fleece for that reason; we saw several in the flock with this species of decoration; they say that this ram would sell in Catalonia for 20 livres. A circumstance which cannot be too much commended, and deserves universal imitation, is the

extreme docility they accustom them to. When I desired the shepherd to catch one of his rams, I supposed he would do it with his crook, or probably not be able to do it at all; but he walked into the flock, and, singling out a ram and a goat, bid them follow him, which they did immediately; and he talked to them while they were obeying him, holding out his hand as if to give them something. By this method he brought me the ram, which I caught and held without difficulty." *

The wool exported from Spain was lately above 9,700,000 lb., of which a portion comes to Britain. In 1829 above 30,000,000 lb. of wool was imported, the greater part of which was from Germany, Spain bearing but a small proportion, only about two-thirds more than what we received from our Australian possessions. In France cross-breeds are cultivated, demi-Merinos as they are called; and in Saxony, Bohemia, and Hungary, they also abound exceedingly.

Among the other breeds of Europe which are not British, may also be mentioned the *Cretan*, distinguished by the horns ascending directly upwards, with a spiral turn; and in a variety termed the *Wallachian*, the horns are equally developed, but diverge nearly at right angles from the head.

But the most remarkable anomaly among the horn-bearing animals is the Many-horned Iceland breed, extending very frequently in this country to the common black-faced breeds of Scotland. Sheep and

* Annals of Agriculture, viii. p. 195.

goats are the only animals which exhibit this multitudinous growth of horns, and in the breed of the former, which we have now alluded to, the flocks are almost in a state of unreclaimed nature, and by far the greater proportion have more than the usual number of horns; and it may be here remarked, that the same circumstance prevails among some of the Asiatic races. The natural horns rise in their proper places, the accessory horns usually upon the sides of the head, and are from one to three in addition. In other points there is no perceptible variation in the animal, from the common characters of the breeds to which it belongs.

Arriving nearer home, let us now look to the breeds of the British Islands, supposed at the present time to possess a living stock of about 32,000,000 sheep, yielding, of course, an immense quantity of wool annually; and there is no country in the world where this branch of rural economy has been carried to so great an extent, or the imported breeds so much improved in value, by an assiduous attention and care to procure the best varieties whence to continue the flock. The improvement has fortunately been attended with very large profits to the individuals who have from time to time engaged in it, and thus it is that we have such variety of constitution adapted either to the deep and rich soil, and luxuriant pas-

ture and balmy climate of the south, the sharper soils and rich grasses of the upland counties, or the high and alpine herbage of the north, cold in its climate and searching in its storms and snows, where the life of the shepherd is no sinecure, but where the summer bite, though short, is nourishing and sweet, and where the heathy mixture imparts a flavour coveted even by the luxurious of the southern metropolis.*

In illustration of the British breeds, we have selected two as opposite as possible, yet each of them very extensively bred. We shall for this time give the preference to those of the south, and first notice

* A considerable number of hind-quarters of the best Scottish mutton is at present exported from Edinburgh to the London dealers, where the article fetches a high price.

THE LEICESTER SHEEP.

PLATE XIV.

AMONG all the artificial breeds of animals, a certain standard has been generally fixed, which is supposed to combine the greatest excellences, according to the purposes for which the animal is employed; and it may be here proper to notice what has hitherto been considered as the most perfect form of the sheep, and which is equally applicable to every breed, as the nearer they approach to this standard, so it is thought they will be most profitable to the owners.

"The head of the ram," writes Mr Culley, "should be fine and small, his face white, nostrils wide and expanded, his eyes prominent, and rather bold or daring, ears short and thin, his collar full from his breast and shoulders, but tapering gradually all the way to where the neck and head join, which must be very fine and graceful, being perfectly free from any coarse leather hanging down; the shoulders broad and full, which must at the same time join so easy to the collar forward, and crops backward, as to leave not the least hollow in either place; the mutton upon his arm or fore thigh must come quite to the knee; all his legs white and upright, with a clean

PLATE 14.

LEICESTER RAM.

PLATE 14.
LEICESTER RAM.

fine bone, being equally clear from superfluous skin and coarse hairy wool, from the knee and hough downwards; the breast broad and well formed, which will keep his fore legs at a proper wideness; his girth or chest full and deep, and instead of a hollow behind the shoulders, that part, by some called the fore-flank, should be quite full; the back and loins broad, flat, and straight, from which the ribs must rise with a fine circular arch; his belly straight, the tail well set up, quarters long and full, with the mutton quite down to the hough, which should neither stand in nor out; his twist deep and full, which, with the broad breast, will keep his fore legs open and square; the whole body covered with a fine thin rosy pelt, and that with a fine long bright and soft wool." *

The Leicester or Dishley breed is now the most common, and most extensively reared, over all the rich and low-lying pasture-land of England. It is distinguished from the other long-woolled breeds by "having fine lively eyes, clean heads without horns, straight broad flat back, round or barrel-shaped bodies, fine small bones, thin pelts, and a disposition to make fat at an early age, with a superiority in the fineness of the grain and flavour of the mutton." † This is properly what was formerly the Lincolnshire breed, remarkable for the quantity of wool, but affording a very coarse and unprofitable mutton. Mr

* Culley, p. 73.

† Dickson's Practical Agriculture, ii. p. 1135.

Bakewell, by attention to the points already mentioned, attempted to combine quantity and quality of wool, with excellency of the meat and early feeding, and effected an improvement in the breed, which was not only productive to himself, but of lasting importance to the agriculturist and wool-grower. The advantages of this breed were so apparent, that, at the introduction of these sheep, Mr Bakewell was said to have made (in the year 1789) 1200 guineas by three rams, 2000 of seven, and 3000 of the remainder of his stock; a return unprecedented in the annals of sheep-breeding. They were capable of being made what may be called enormously fat at an early age. Mr Culley killed a three years old wether in October 1787, with more than seven inches of solid fat on his ribs; and it was common for two years old wethers to have four inches of thickness of fat on the ribs, and from two to three all down the back. This breed has now extended to the south of Scotland, and a few are kept by almost all the smaller farmers, for the sake of wool for his family; and with every cottar who has the means of keeping a *pet*, this is the kind which is selected, both from its abundant fleece, and its quiet, unstraying manners. In some districts, a valuable race has sprung from a mixture with both the Cheviot and black-faced breeds. The latter we now illustrate by a representation of

BLACK FACED RAM.

THE BLACK-FACED RAM.

PLATE XV.

The Ancient, or Black-faced Heath-breed, extends from the north-western parts of Yorkshire to all the high districts of the Highlands, particularly those of the western coast. It is by far the most picturesque looking of our sheep, and, with wild little Kyloe, is a fitting accompaniment to the landscape of our northern hills. It is extremely active and hardy, even somewhat goat-like in its motions and scansorial habits; of a firm, compact make, a piercing and wild-looking eye; the horns in the male very large and voluminous, more convoluted than even in the Merino; the wool long, coarse-like and shaggy; the face and legs always black. There are spurious breeds, which have the face and legs brownish, and spotted with black; but, in the words of Dr Walker, in the true ram "his face and slender legs are black as jet, without any mixture of white." The flesh or mutton is fine grained and well flavoured, but the wool is coarse, and comparatively unprofitable, which has of late caused a considerable change of the northern stock to the Cheviot breed, which are found to be nearly equally hardy, and to yield a more profitable

fleece. Many attempts have been made to improve this breed. The Norfolk and Suffolk sheep are supposed to be derived from them, also the Dorset breeds.

The Hebridian is also a remarkable breed of British sheep. It is the smallest animal of its kind, of a thin lank shape, and with short straight horns. The face and legs are white, the tail extremely short, and the wool of various colours; for, besides black and white, it is sometimes of a bluish-grey colour, at other times brown, and sometimes of a deep russet, and frequently an individual is blotched with two or three of these different colours. In some of the low islands, where the pasture answers, the wool of this small sheep is of the finest kind, and the same with that of Shetland. In the mountainous islands, the animal is found of the smallest size, with coarser wool, and with this very remarkable character, that it has often four, and sometimes even six, horns. *

In conclusion we shall give Mr Culley's synoptical table of the British breeds, of which he enumerates sixteen:—

* Dr Walker's Economical Hist. of the Hebrides, ii. 69.

				Fleece lb.	Quarter lb.	Age Years
1. Dishley,	No horns,	White face and legs,	Combing wool,	8	25	2
2. Lincoln,	ditto	ditto	ditto	11	25	3
3. Teeswater,	ditto	ditto	ditto	9	30	2
4. Dartmoor,	ditto	ditto	ditto	9	30	2½
5. Exmoor,	Horned,	ditto	ditto	6	16	2½
6. Dorset,	ditto	ditto	Carding wool,	3½	18	3½
7. Hereford,	No horns,	ditto	Fine wool,	2	14	4½
8. South Down,	ditto	Grey face and legs,	ditto	2½	18	2
9. Norfolk,	Horns,	Black face and legs,	ditto	2	18	3½
10. Heath,	ditto	ditto	Coarse combing,	3½	15	4½
11. Herdwick,	No horns,	Speckled face & legs,	Carding,	2	10	4½
12. Cheviot,	ditto	White face and legs,	ditto	3	16	4½
13. Dun-faced,	ditto	Dun face and legs,	ditto	1½	7	4½
14. Shetland,	ditto	Colours various,	Fine cottony,	1½	8	4½
15. Romney Marsh,	No horns,	White face and legs,	Combing,	8	25	2½
16. Spanish,	Horns,	ditto	Carding,	3½		

We quote the following from M'Culloch's Commercial Dictionary, 1825 :

Number of long-woolled sheep in England and Wales in 1800, was		4,153,308
Number of short-woolled do. . . .		14,854,299
		19,007,607
Slaughter of short-woolled sheep per annum, . . .	4,221,748	
Carrion of do. . .	211,087	
Slaughter of long-woolled do.	1,180,413	
Carrion of do. . .	59,020	
Slaughter of lambs, . .	1,400,560	
Carrion of do. . .	70,828	
		7,140,856
Total Number of Sheep and Lambs,		26,148,463

" In some parts of England there has been an increase in the number of sheep since 1800, and in others they have decreased. But we have been assured by competent judges that upon the whole the number has not materially varied in the interim.

" During the last half century a very decided increase has taken place in the number of sheep in Scotland, and a very great improvement in the breed, particularly in the Highlands.

" In the *General Report of Scotland* (Vol. iii. Appen. p. 6.), the number of sheep is estimated at 2,850,000; and allowing for the increase that has taken place since 1814, we may perhaps estimate the total number of sheep in that part of the empire at this moment (1835), at 3,500,000.

"In Ireland, the total number may be estimated at about 2,000,000; and on the whole, therefore, 32,000,000 may be assumed as the grand total number in Great Britain and Ireland at the present time."

Of the African breed of sheep, one of the most abundant is the Long-legged Sheep; according to F. Cuvier, the *Ovis Africana* and *Æthiopica* of systematists, but evidently only a peculiar form of the animal. It is particularly characterized by the great length of the legs, the pendulous ears, the arched forehead, and the fleece, which is short, curled, and crisp; upon the neck it assumes the form of a mane, and on the shoulders often spreads out from a centre, like hair on the rump of the camel or dromedary. Cuvier's figure is represented black and white, and was procured from Faisan. We may here notice, as somewhat allied, a breed from Persia.

THE PERSIAN SHEEP.

PLATE XVI.

THIS seems somewhat allied to these, has the pendulous ears and arched profile, stands somewhat high, and has short crisp wool. It now forms part of the collection in Edinburgh. For several years it was kept tame in Mr James Wilson's garden, and we are indebted to that gentleman for the account of its life and manners during the period he preserved it.

"The black-headed sheep which lived with me as a pet for nearly a year and a half, was, I understand, one of a small flock (originally from Persia) received some time before by Sir James Gibson Craig. The individual in question had been sent to the Edinburgh Museum as a *specimen*. It was thin, and in poor condition; but being otherwise an interesting creature, I begged and obtained its life from Professor Jameson, on condition that when it died a natural death, I would return it. I accordingly took it out to Woodville, where it rejoiced greatly in its first feed of sweet fresh grass, after a sojourn of some days in a large lumber room in an old part of the College now no more. As winter was approaching, we generally housed it in the stable before night;

THE PERSIAN SHEEP.
Edin.r R. Museum.

but it was always on the alert at an early hour in the morning, and anxious to be brought to a little plot of grass before our cottage windows, where it seemed to enjoy the vicinity of human beings, and delighted to be spoken to or fondled by children. It was extremely mild, gentle, and affectionate in its disposition,—never attempting to make a *butt* of, or otherwise annoy, its friends. It would follow us about the garden, and, if taken no notice of, would frequently remind one of its presence by a gentle insertion of its muzzle into the hand, or even pocket. This habit probably arose from its being so frequently fed throughout the day with bits of bread, biscuit, apples, &c. Although, of course, not allowed to go at large in the garden, it often escaped there from its own little plot of grass, and wandered about, apparently with a view to satisfy rather its curiosity, or love of company, than its appetite; for it seldom touched any of the plants, except those (of the culinary kind) to which it had a legal right. It continued thin and rather feeble all winter, but as the weather improved in warmth and brightness, it obviously increased in health and spirits, and throughout the summer season its motions were very free and graceful, and its attitudes at times expressive of great boldness. To human creatures, however, especially children, it continued to be uniformly gentle and attached; but it shewed great spirit in driving all strange dogs from the door, and I once saw it greatly astonish a large bull-terrier, by suddenly

bounding upon it, and knocking it head-over-heels. When in a state of eagerness or excitement, it paced about more like a deer than a domestic sheep; that is, it held its head and neck very erect, and its fore limbs very straight and firm, lifting its feet high while walking, and setting them down with force. The stuffed specimen conveys no notion of the way in which it stood upon its pins. When a carriage came to the door, it would stamp with its feet, and utter a deep tremulous angry bleat, as if to deter the horses from entering any farther upon its domains.

"It became again feeble and emaciated about the middle of the second winter, and died in the stable during the prevalence of a severe storm of frost and snow. Though of a picturesque and pleasing aspect, it was not of a form or countenance to be admired by the cultivators of our domestic sheep; its arched front, and various other characters, partaking strongly of the acknowledged attributes of our unimproved breeds. Its death, however, was deeply regretted by us all."

It appears to spread itself into many varieties; the Morocco breed: the Congo breed, with a very arched profile, and covered with very loose wool instead of hair; the ears very pendulous, two wattles beneath the throat, and the tail very long and slender: the Guinea breed, and the Angola races, which have a finer wool, and the profile more nearly approaching to the form of the sheep of Europe. There is a curious variety which Major Smith refers to the Angola

race, and has given a figure under the name of the Zunu or Goitered breed, " it has the singular peculiarity of a mass of fat rising in the form of a high collar behind the horns, and resting upon the occiput, while upon the larynx another mass of fat hangs like a goitre under the throat."

But one of the breeds of Africa which has been perhaps as often noticed as any other, is the large-tailed or fat-rumped sheep of South Africa. The races of this variety also extend to other parts of Africa, and apparently also to Asia. We here represent

THE BARBARY BROAD-TAILED SHEEP.

PLATE XVII.

FROM the great commercial intercourse possessed by the Cape of Good Hope, we might expect to find a large proportion of varieties among those animals which are domestic, and accordingly we find very various breeds both from Europe and India, and particularly some of the Dutch and Flemish breeds; but the Broad or Fat-tailed, is now what is termed the South African or Hottentot breed. It is below the middle size. The fleece soft and short wool, and the name is derived from two masses of fat on each side of the inferior part of the tail, which often reach a great weight, and are esteemed as a delicacy; those sheep which can grow them heaviest and largest being picked out and endeavoured to be continued as a breed, on account of the luxury of this part; a little carriage with wheels is sometimes attached to bear up the tail and protect it from rubbing on the ground. The *Ovis steatopyga* of southern Tartary, also belongs to these, but the ears are long and pendulous, while the broad-tailed breeds of northern and

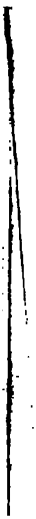
PLATE 17

J.Stewart del.

Lizars sc.

BARBARY BREED OF WILD SHEEP.

Cuvier.



middle Asia have the ears pointing forwards, the profile much arched, and the horns from three to six in number.

The *O. steatopyga* or Fat-rumped Sheep of Pallas, the same we have just alluded to, is reared throughout all the temperate regions of Asia, from the frontiers of Europe to those of China in the vast plains of Tartary, where the hordes of Kirguize Tartars lead a wandering life, seeking fresh and fitting pasture. The body of the animal towards the posteriors swells gradually with fat; but the characteristic mark is the deposition of a solid mass of fat on the rump, which falls over in the place of a tail, divided into two hemispheres, which take the form of hips, with a little button of a tail in the middle, to be felt with the finger. It sometimes becomes so loose as to incommode the sheep, and weighs thirty-eight pounds.*

The subject of our plate is from the figure of Frederic Cuvier, and is the Barbary breed, with the profile arched, the ears of middling size and pendant; the fleece of a thick but coarse wool, the horns have the direction of those of the Moufflon, and the tail, on each side, is loaded with an accumulation of fat.

All observers have attributed this accumulation of fat to the peculiarity of feeding, but there seems no reason or detail of experiments which can prove any thing satisfactorily; Fred. Cuvier remarks, that the

* Pallas's History of Russian Sheep.

fat of the tail when run, will never assume the solidity or consistency of the tallow of the other parts of the body,—arguing from this that there is something different in its secretion. Dr Pallas suggests that it may be the prevalence of wormwood in the Asiatic pasture, which causes fat on the *O. steatopyga*, and the efflorescence from the salt lakes which impregnate the pasture.

Among the Asiatic breeds, besides the Fat-rumped Sheep, which we have noticed, that of the Broad-tailed extends very widely, to India, China, and Russia. One of the most celebrated, however, is the Astracan breed or Boucharian breed of Pallas, belonging also to this. It is remarkable for the fine spirally twisted wool; and it is from this breed that a great portion of the lamb skins, so much in request by the furriers, is procured. The colour of the wool is generally a pleasing mixture of black and white; and Fred. Cuvier remarks, that among the broad-tailed breeds, the wool of the young has a very great tendency to be united into two small twisted curls, closely united, but which, soon after birth, are separated; on this account, the skins of the lambs which are taken from sheep which have died, are much more valuable, and those of an entirely black tint are most sought after.

A small flock of this breed was introduced into France in 1821, by the Duke de Richelieu, with the intention of having them extended and brought to propagate in the country, and endeavour to organize

a commerce of the lamb skins. The attempt, we believe, has not since been heard of.*

The Tscherkessian Sheep of the Russians and Tartars, mentioned by Pallas, as the *Ovis Dolichura*, is also very extensively used for the same purpose. It is a handsome animal resembling some of the Spanish and English breeds. The rams are horned, the wool is coarse in the adult state, and the tail, which contains twenty vertebræ, is covered with fine long wool, which trails on the ground, so as to efface the prints made by the animal's feet. It is reared in all the European regions situated on this side of the river Occa, by the pastoral people of Mount Caucasus. They are commonly of a white colour. There is also more art resorted to here in the preparing of the lamb skins. As soon as the lamb is dropped, it is sewed up in a sort of coarse linen shirt, so as to keep up a gentle pressure on the wool, pouring warm water over it every day to make it soft and sleek, only letting out the bandage a little from time to time as the animal increases in size, but still keeping it tight enough to effect their purpose, which is to lay the wool in beautiful glossy ringlets, and thereby produce a delicate species of fur, in great request for lining clothes and morning gowns; and the animal is killed younger or older, according to the specimens

* According to Dr Maculloch, the number of lamb skins imported in 1831 and 1832 (chiefly from Italy), amounted to 2,365,635.—*Dictionary.*

of fur intended to be produced. Black is also in the most esteem.*

The most beautiful Indian breed is said to be from Mysore, hornless, with pendulous ears, short tail, and the wool very fine, curled in small meshes, and twisted like a cork skrew.

Having reviewed the Sheep, Major Smith finds his way to the Bovine races, by means of a series of large and powerful animals, uniting in some degree the features of both, but although hitherto generally referred to the Antelopes, from the outward appearance of their horns, yet, perhaps, their real structure approaches nearer to the oxen then either to the Antelopes, or the Sheep and Goats. Mr Swainson, in his late arrangement, places the *Damalis* of Smith, as the last of the Goat, which he includes in his family *Antelopidæ*, while he makes *Catoblephas* or the *Gnu* at the commencement of the *Bovidæ* or the typical form of the Ruminants.

They are all rather large animals. The interscapular or first vertebræ of the back are generally elevated above the rest of the spine; and Major Smith has observed a curious structure in the horns. They are "placed on or even above the ridge of the frontals, having within the osse-

* Pallas's History of Russian Sheep.

ous nucleus or case a considerable cavity, communicating (in all the species we have been able to examine), externally by a sinus, which passes under the horny substance, nearly opposite the root of the ear."* With one exception they inhabit Africa.

The *Damalis*, as a genus, or his *Acronotine* group, Major Smith has divided into subgenera, the first of which will be represented by

* Major Smith, iv. p. 345.

BUBALIS.
Cuvier.

J.Stewart del.

Dwars sc.

In the Dictionnaire Classique, it is mentioned, that on some antique carving, the peculiarity of the horns which the Bubalis exhibits, is distinctly marked on some ox-like animals represented harnessed to a chariot; while in others, supposed to be true oxen, no such marking of the horns is visible: from hence it becomes a question whether or not this animal was not tamed and sometimes used by the ancient Egyptians as beasts of draught, for in these representations such minute descriptions are often most scrupulously attended to.

The Corina is another fine animal belonging to this group, the Hartbeest of the Cape colonists, but now, from being much hunted, having become rare within the bounds of the colony; according to Pennant, who confounds this with the last, they go in great herds, a few only being solitary. They gallop with a heavy pace, yet go swiftly, and drop on their knees to fight like the white-footed Antelope or Nil-Ghau.* This is stated on the authority of Sparman, but Major Smith observes that they reside in small flocks of ten or twelve, in the interior of Caffraria.

The *Collared damalis*, *A. saturosa*, is another animal but little known, and supposed to inhabit Africa, is described in the Berlin Transactions. *A. Senegalensis*, the Koba, is known almost only by the skull, and has yet been imperfectly described;

* Pennant's Quadrupeds.

PLATE 19.

THE IMPOOPO.
or Elk Antelope

and the *Sassayby* of Mr Daniel, is the last which is referred to this form, termed *A. lunata* by Smith, and described from a specimen procured by Mr Burchell, which he refers to Daniel's animal, though sufficiently accurate notes are wanting of this. Mr Burchell met with a single specimen in the Booshwana country, a female. The horns were robust, rising from the summit of the frontal crest at the base, close together, swelling out a little forwards, and then backwards. The height of the imperfect skin was about three feet at the shoulder, two feet eight inches at the croup. The fur of a deep blackish purple brown, the ears assinine, six inches and a half long, lined with light hair within and on the edges. There is a lacrymary sinus. The face is of a rufous dun colour, and a black streak commences between the horns, contracting between the eyes, and again widens near the nostrils.

The next is a very remarkable group or subgenus, *Boselaphus*, restricted by Major Smith to two species, and now represented by

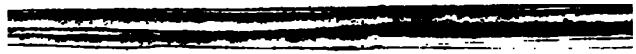


PLATE 19.

THE IMPOOPO.
or Elk Antelope

THE IMPOOFO.

Baselaphus oreas.—SMITH.

PLATE XIX.

IN this animal there is a great resemblance to some of the oxen. Its large size, its more clumsy form, its heavy gait, and the large hairy dewlap, all remind one of them. At present, the Impoofo is found on the Karoo plains, in company with some of the larger inhabitants and ostriches of these districts; though formerly it was so abundant in the Cape colony, and so easily managed by a swift horse, that the hunters would drive it in the direction of their homes, and bring it down only when they thought it convenient for their servants to carry it home.*

These animals, Lichtenstein observes, are much esteemed by the colonists for food. Hunting parties are often made from some settlement, attended with all the necessary apparatus, wagons to carry home the spoil, &c. The meat is cut in pieces on the spot, salted and packed in the skins, and some of it is smoked. The great muscle of the thigh

* Major Smith.

smoked is more particularly esteemed; these are cut out at their whole length, and from the resemblance they bear to bullock's tongues are called *Thigh Tongues*. They are sent as presents or for sale to Cape Town, and are eaten raw with bread and butter, cut into very thin slices. The taste of Eland's flesh, when eaten fresh, much resembles beef. The skins are much esteemed for making leather, and the horns are formed into tobacco pipes.* Thus, they appear to be a very useful animal, and it must be regretted that persecution is likely to destroy the species in the vicinity of civilization.

According to the above quoted author, the Eland is from seven to eight feet in length, and about four feet high. They are sometimes found in groups of twenty or thirty together, but more commonly from eight to ten, of which there are seldom more than one or two males, which are fattest, and are always singled out for destruction. They run swiftly at first, but are easily wearied and run down, and are said by the peasants to be more easily taken by man than any other of the African animals.

Major Smith gives the dimensions larger those of Lichtenstein. The weight often above a hundred pounds; the length between eight and nine feet. The height of a female in the Tower was five feet at the shoulder; and Mr Barrow mentions a male six feet and a half high. The horns are placed on the sum-

* Lichtenstein's Travels, Engl. Trans. i. 97.

mit of the frontal bone, sometimes two feet in length, and having a spirally twisted appearance. On the middle of the forehead there is a recurved crest of bristles, reminding us of what will be seen in the Gnu, and which passes along the ridge of the neck. The colour of the animal appears of a dirty grey, a rufous or buff colour being placed on a black hide. The hoofs resemble those of a Guernsy cow. The females exhibit all the separating marks which distinguish the bull and cow, less powerful neck, smaller horns and dewlap, and altogether a smaller bulk.

The other species which Major Smith has introduced into this subgenus, he denominates *B. Canna*, an animal comparatively little known, and generally confounded with the preceding. It is of less size. The general colour is a dark brownish grey, a white space between the forelegs. They are met with in the same districts with the Impoofo, but the herds never mingle; and from the colonists they receive the name of Bastard Eland.

The next subgenus is also an African form, and is illustrated by

THE KOODOO.

Strepsiceros koodoo.—SMITH.

PLATE XX.

Antelope strepsiceros *of Authors.*—Striped Antelope, *Pennant's Quad.* i. p. 77.—The Koodoo, *Daniel.*—Damalis (Strepsiceros), *Smith in Griffith's Cuvier*, iv. 357.

THIS is a large and very beautiful animal, combining many of the characters of the Sheep, Oxen, and Antelopes. The male is nearly four feet high, and about eight feet long, exclusive of the tail. The general colour is a sort of buff-grey, with a line of white passing down the spine, crossed by four or five others from behind the shoulders, and from two to four across the croup. The forehead is black, and a white line passes over the orbits; a ridge of black hair runs along the crest of the neck, and a similar one, longer and coarser, hangs from the dewlap. The horns rise from the crest of the skull, and rise perpendicularly up in large spiral whorls. Mr Pennant mentions them as three feet nine inches in length.

The Koodoo inhabits the woody parts of Caffraria and the Karoo Mountains; but like the other large species, begins to get scarce. They are fleeter than the

THE KOODOO.
Daniel.

last, but cannot keep up a long run, coming speedily to bay, and defending themselves with their long horns.

We have now reached the last form among the Antelopine animals, and also among those which our guiding author has placed in a manner by themselves, combining a variety of characters, but having one in particular, the shoulders always standing considerably higher than the croup. The three last groups of this description were found in Africa. The present animal inhabits Northern India; and though exhibiting the same make, and, as it were, humped form at the shoulders, is rather a graceful animal; but it is a curious circumstance, and shews their affinity, that by the native names these animals are not at all grouped with the antelopes, but invariably bear some designation having the meaning of cow or ox, with some accessory attached, derived from their colour or other distinguishing mark. It will be illustrated by

THE NEEL-GHAU.*

Portax picta.

PLATE XXI.

Antelope picta *of Authors.*—Nyl-Ghau, *Phil. Trans.* vols. xliii. and lxi.—The White-footed Antelope, *Pennant's Quad.* i. 74.—Neel-Ghau of the Indians.—Portax risia, *Major Smith in Griffith's Cuvier.*

THIS very beautiful and active-looking animal is found on the jungles bordering the woods of Northern India, and from all our accounts, seems to increase in number as we approach the confines of Persia. Our first accurate information regarding it, is acknowledged by all to be due to Lord Clive, who introduced a pair to this country in 1767, which bred regularly, and were tame and gentle. Another pair were soon after described in detail by Dr W. Hunter, the brother of the distinguished anatomist and naturalist, whose memoir precedes the descriptive portion of this volume.

The specimen which served for the accompanying illustration, with a female, forms a part of the Edin-

* Blue or Grey Bull.

PLATE 21.
THE NYL-GHAU.

burgh Collection, and is in a very perfect state of preservation. The colour generally is an agreeable dark grey; the colour is composed by two or three tints on each hair, black, brownish, and white; and although at a little distance, the general shade is produced, an inspection within a few yards shews as it were a speckled appearance. The hair is not thick, and is of a more rigid texture than in many of the antelopes. The horns are seven or eight inches long, round, the curve directed forward, and the base indistinctly rigid. The head, legs, and under parts of the body are of a much darker shade than the body, in many species nearly approaching to black. There is rather a strong mane, and the breast or dewlap is tufted with long pendulous black hairs. The legs are curiously marked by a transverse white mark in front, and by a second patch opposite to the accessory hoofs on the inner side. These are very conspicuous on the dark legs, and look like the traces or analogy to the peculiar colouring of some other animals. The female also, in Edinburgh, is of a pale reddish-fawn colour, rather less, and without horns. The young males are said to be of a similar tint.

Mr Bennet mentions, that in captivity it is gentle, and licked the hands of those who offered it bread, suffering itself to be played with, not only without shyness, but with evident pleasure. When meditating an attack, it falls suddenly on its fore-knees, shuffles onward in that posture until it has advanced to within a few paces of the object of its

irritation, and then darts forward with a powerful spring, and beats with its head in the most determined manner;* and both horse and rider have been prostrated by a charge of these animals. Dr Hunter has mentioned an instance of their strength while butting, which proved fatal to the animal. "A poor labouring man, without knowing that the animal was near him, and therefore neither meaning to offend, nor suspecting the danger, came up near to the outside of the paling of the enclosure, the Nyl-Ghau, with the quickness of lightning, darted against the wood-work with such violence, that he broke it to pieces, and broke off one of his horns close to the root."†

In the Philosophical Transactions it is mentioned by Dr Parsons, that the animal never lay upon the side, but always upon its limbs, like the Camel. There was something particular in his voice, which imitated the croaking noise of a child's rattle, or the croaking of some birds; and of the pair which are recorded in the same valuable work as entrusted to the care of Dr W. Hunter by the Queen, it is noticed that the male, though reported to be a very vicious animal, was in reality a most gentle creature, and seemed pleased with every kind of familiarity, always licked the hand which either stroked or gave it bread, and never once attempted to use its horns offensively. It seemed to have much dependence on its organs of smell, and snuffed keenly or with noise,

* Bennet, Zool. Gardens. † Phil. Trans.

whenever any person came within sight; it did so likewise when any food or drink was brought to it, and was so easily offended with a smell, or so cautious, that it would not taste the bread which the Doctor offered, when his hand had touched oil of turpentine or spirits.*

The Neel-Ghau is hunted in Persia in the favourite manner of pursuing large game in the east. "The animals are enclosed with large nets, which are gradually brought towards each other, till they encompass only a small space. Into this the king, omerahs, and hunters enter, and kill them at pleasure, either with arrows, short pikes, sabres, or muskets, and sometimes in such quantities, that the king is enabled to send a portion of them in presents to all the omerahs."†

* Philosophical Transactions.

† Voyages de François Bernier, ii. p. 225.

THE GNOO.

Catoblepas Gnu.—SMITH.

PLATE XXII.

Antelope Gnu of English Authors.—The Gnoo, *Daniel, Illust. of the Scenery of Southern Africa.*—Catoblepas Gnu, *Smith in Griff. Cuv.*

WITH this very singular animal Major Smith commences the Bovine race, and he is followed in a similar manner by Mr Swainson in his family *Bovidæ*. We shall particularly notice the family as we proceed, after describing the present animal and the Musk Ox. Mr Smith indicates four species, and applied the above generic name to them. They inhabit the plains of Central and Southern Africa, abounding on the arid deserts in company with herds of the zebra and quagga, and flocks of ostriches, and beyond the bounds of civilization, where some species have not been nearly extirpated, are almost always found in company. The aspect of the head is decidedly bovine, the forehead is ample and flat, and the horns, which are present in both sexes, are placed on the fore part of the frontal ridge, flattened and large, and nearly meeting at the base. They

THE GNU

then bend forwards and downwards, and then suddenly upwards, are round and nearly smooth. The muzzle is broad and developed, and Major Smith and some others have observed a peculiar valve of a triangular form, which opens and closes at pleasure. On the brows and on the ridge of the face the hair is very long and shaggy, and curves forward, and in the whole aspect there is something fierce and restless. The neck is furnished above with an ample rigid mane, and on the lower part of the breast with a long and hairy dewlap. The general colour is a yellowish tawny, darkest on the back and legs; the tips of the mane, dewlap, and tail whitish. In the old specimens the white of these parts disappear, and are nearly black. The young are said to be white, but the indications which have been received are vague, as far as the species is described.

The Gnoo is extremely swift and active, and while not engaged in feeding, is sportive in manner, standing to gaze at one time, and at the next moment wheeling and scampering over the plains with immense rapidity. We had an opportunity many years since of seeing a specimen of this animal in Wombwell's Menagerie, which was quite mild and tractable, and in appearance, from the disproportionate fineness of the limbs to the heavy looking body, did not seem to be capable of the speed which is generally attributed to it. It is remarkable that the cry of this animal is somewhat like that of the bellow of a bull.

This species is the smallest and most common of

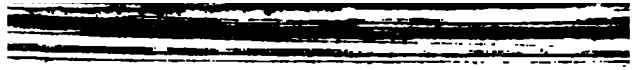


PLATE 23

THE MUSK OX

THE MUSK OX.

Ovibos moschatus.—BLAINVILLE.

PLATE XXIII.

Bos moschatus *of Authors.*—Musk Ox, *Hearne, Pennant, &c.*—Ovibos moschatus, *Blainville, Nouveau Dictionnaire.*

THIS animal may perhaps have an appropriate station as an intermediate form, connecting this division with the sheep, which De Blainville has endeavoured to express in his generic name. The appearance of the countenance, the long hair, or rather a sort of wool, ally it with the latter; while the horns and other parts of the form bring it nearer to the oxen, with which, by common consent, its namers, * whether scientific or otherwise, have combined it.

The Musk Ox inhabits the barren lands of America lying to the northward of the 60th degree of latitude, and ranges to Melville Island over the islands which lie to the north of the American continent. They frequent country destitute of wood, rocky and barren, and they feed alternately on grass or lichens. They assemble in herds of thirty or forty, and are

* The Cree and Copper Indians have names which signify "ugly and little Bison."—*Richardson.*

THE BOVINE TRIBE, OR OXEN.

The animals which we have now arrived at, and with which zoologists have generally concluded the family of the ruminants, are fully equal to the wool-bearing tribes in value and utility. The several species and various races of Oxen, in all countries, are most important in the economy of the inhabitants. They are used for labour, and even assist in the wars of their masters. Their flesh affords a nourishment for the body, while their skin, hoofs, and horns, are indispensable for the stronger articles of clothing, and in the manufacture of many substances in daily use. In some countries they are so much esteemed, and their produce of milk and butter, &c. held in so much value, that they are never slaughtered except on the most extraordinary occasions, and never used as an article of common or general food. In other countries they are only used for the purposes of sacred offerings. In Egypt the bull was long considered a sacred animal; and in the mythology of the Hindus the "holy cattle" are cared for, and their molestation punished with the severest penalties.

In almost all the countries where oxen are employed, and this is over a great part of the known

world, the varieties of the European domesticated races are almost the only animals which are used, few of the other species having yet been found capable of being domesticated to any extent, or easily reared in confinement.

Wherever the breeds may have originally arisen, or from whatever primitive stock they may have sprung, they have spread far and wide, over the European continent; they have reached north and south Africa, and now exist in innumerable herds. In the latter countries, they form a most important source of wealth, and are tended with the utmost care, their skins regularly dressed, and their horns twisted and variously ornamented. In North America, they are more numerous now than the wild buffalo; and in the steppes of the southern continent they range in immense droves, almost in a state of unreclaimed nature.

In tracing the origin of these breeds, so extensively spread, and affording a boon of such importance to mankind, there is much difficulty, no records of introduction or of produce existing; and we are driven to a comparison of the parts least subject to variation with corresponding parts of the wild species with which we are acquainted. In the British collections at this moment, we believe there are not materials for such a comparison; but in the works of Cuvier we shall find this in a great measure supplied, and whatever additional information may be within our reach shall be added. We shall begin

with certainly the most important, and endeavour to trace the stock of our domestic races of cattle, and the forms they are supposed to assume in extra European countries. These stand in our systems as the *Bos taurus* of the older naturalists, the *B. taurus domesticus* of Linnæus.

It may be observed in this place, that our author, whose arrangement we have followed, divides this group into three subgenera, *Bubalus*, *Bison*, and *Taurus*. Mr Swainson, in his Natural System, makes *Bos* as pre-eminently typical of the *Bovidæ*.

By most persons it is thought that the domestic races of our cattle are originally sprung from the *Bos bubalus*, the Indian and European Buffalo. Some, again, treat of them as arising from the Aurochs or wild cattle of Germany and Poland. These, according to the system of Smith, come into subgenera different from the domestic breeds; and from both these suppositions the opinion of the Baron Cuvier varies, as he is inclined to consider our present cattle identical with a species no longer existing in a wild state, but which has, by the exertions of man, as in the instance of the Camel and Dromedary, been for ages entirely subjected to his power. The remains of this animal has been found in a fossil state, and it is upon the comparison of these remains with the skeleton of the Auroch, the Buffalo, and our domestic races, that the Baron has founded his opinion.

In examining the skull of any of the breeds of

our domestic cattle, we shall find the front flat, and even a little concave; and in the horned varieties the horns are attached to the most elevated ridge of the skull, both of which may be seen in the annexed cut of the skull of a large horned Italian breed. The plane of the occiput forms an acute angle with the front in the domestic breed, and is quadrangular.

In the Aurochs, again, the plane of the occiput forms an obtuse angle with the front, is semicircular, and the forehead is very markedly convex. The annexed cut

will shew the convex skull of the Auroch, with the position of the horns; while beneath is given that of

the domestic breed. There are other parts of their form which are also very different. The limbs of the Auroch are slighter, and more slender, and the number of ribs is fourteen, whereas in the domestic breeds they are only thirteen. The Aurochs belong to the Bisontine group.

The Buffalo belongs to the Bubaline group, and differs even more than the Aurochs in form.

Major Smith places the fossil species, under the title of *Bos (taurus) Urus*, and considers the wild cattle of our parks as the white variety. The cut below exhibits the form of the head of Cuvier's fossil

species; while the wild breed of Hamilton is represented on the accompanying Plate.

THE WHITE URUS, OR HAMILTON BREED OF WILD CATTLE.

Taurus Urus.—Variety.

PLATE XXIV.

Urus Scoticus, *Smith.*—Wild Cattle, *Pennant, Bewick, &c.*

THE White Urus (*Urus Scoticus* of Major Smith) is now only to be seen in one or two enclosures, which the proprietors are anxious to uphold, and, from the variety of the breed, not to allow it to be indiscriminately spread. The most remarkable now are the parks of Chillingham in Northumberland, the property of Lord Tankerville, and that of Hamilton Palace in Lanarkshire, where the drawing for the accompanying illustration was made.

" This* very ancient and peculiar breed of cattle has been long kept up with great care by the noble family of Hamilton, in a chase in the vicinity of their splendid seat at Hamilton, in the Middle Ward of the county of Lanark. They are generally believed to be the remains of the ancient breed of white cattle

* We are indebted to Robert Brown, Esq. Chamberlain to His Grace the Duke of Hamilton, for having procured for us the following interesting account.

THE WHITE URUS.
(or Hamilton breed of wild Cattle)

which were found on the island when the Romans first visited it, and which they represent as then running wild in the woods. The chase in which they browse was formerly a park or forest attached to the Royal castle of Cadzow, where the ancient British kings of Strathclyde, and subsequently kings of Scotland, used frequently to reside and to hold their courts. The oaks with which the park is studded over, are evidently very ancient, and many of them are of enormous size. Some of these are English oaks, and are supposed to have been planted by King David, first Earl of Huntingdon, about the year 1140. The chase is altogether of princely dimensions and appearance, amounting to upwards of 1300 Scotch acres. The number of white cattle at present kept is upwards of sixty. Great care is taken to prevent the domestic bull from crossing the breed; and if accidentally a cross should take place, the young is destroyed. In their general habits, they resemble the fallow-deer more than any other domestic animal. Having been exposed, without shade or covering of any sort, to the rigours of our climate from time immemorial, they are exceedingly hardy; and having never been caught or subjected to the sway of man, they are necessarily peculiarly wild and untractable. Their affection for their young, like that of many other animals in a wild or half-wild state, is excessive. When dropt, they carefully conceal them among long grass or weeds in some brushwood or thicket, and approach them cautiously

twice or thrice a-day, for the purpose of supplying them with the necessary nourishment. On these occasions it is not a little dangerous to approach the place of retreat, the parent cow being seldom at any great distance, and always attacking any person or animal approaching it with the utmost resolution and fury. The young calves, when unexpectedly approached, betray great trepidation, by throwing their ears back close upon their necks, and lying squat down upon the ground. When hard pressed, they have been known to run at their keepers in a butting menacing attitude, in order to force their retreat. The young are produced at all seasons of the year, but chiefly in spring. The mode of catching the calves is to steal upon them whilst slumbering or sleeping in their retreat when they are a day or two old, and put a cloth over their mouths, to prevent them crying, and then carry them off to a place of safety without the reach of the herd, otherwise the cry of the calf would attract the dam, and she, by loud bellowing, would bring the whole flock to the spot, to attack the keeper in the most furious manner. These cattle are seldom seen scattering themselves indiscriminately over the pasture, like other breeds of cattle, but are generally observed to feed in a flock. They are very chary of being approached by strangers, and seem to have the power of smelling them at a great distance. When any one approaches them unexpectedly, they generally scamper off to a little distance to the leeward, and

then turn round in a body to smell him. In these gambols they invariably affect circles; and when they do make an attack—which is seldom the case—should they miss the object of their aim, they never return upon it, but run straight forward, without ever venturing to look back. The only method of slaughtering these animals is by shooting at them. When the keepers approach them for this purpose, they seem perfectly aware of their danger, and always gallop away with great speed in a dense mass, preserving a profound silence, and generally keeping by the sides of the fields and fences. The cows which have young, in the mean time, forsake the flock and repair to the places where their calves are concealed, where, with flaming eyeballs and palpitating hearts, they seem resolved to maintain their ground at all hazards. The shooters always take care to avoid these retreats. When the object of pursuit is one of the older bulls of the flock, the shooting of it is a very hazardous employment. Some of these have been known to receive as many as eleven bullets, without one of them piercing their skulls. When fretted in this manner, they often become furious, and, owing to their great swiftness and prodigious strength, they are then regarded as objects of no ordinary dread.

"The White Urus, or Hamilton breed of wild cattle, differs in many respects from any other known breed. As compared with those kept at Chillingham Park, Northumberland, by Lord Tankerville,

they are larger, and more robust in the general form of their bodies, and their markings are also very different. In the Tankerville breed, the colour is invariably white, muzzle black, the whole of the inside of the ear, and about one-third of the outside, from the tip downwards, red. The horns are very fine, white, with black tips; and the head and legs are slender and elegant. In the Hamilton Urus, the body is dun-white, the inside of the ears, the muzzle, and the hoofs black, and the fore-part of the leg, from the knee downwards, *mottled with black*. The cows seldom have horns; their bodies are thick and short; their limbs are stouter, and their heads much rounder than in the Tankerville breed. The inside or roof of the mouth is black, or spotted with black. The tongue is black, and generally tipped with black. It is somewhat larger in proportion than that of the common cow; and the high ridge on the upper surface, near to the insertion of the tongue, is also very prominent. It is observable that the calves that are *off* the usual markings are either entirely black or entirely white, or black and white, but never red or brown. The beef, like that of the Tankerville breed, is marbled, and of excellent flavour, and the juice is richer, and of a lighter colour, than in ordinary butcher-meat. The size of the smaller cows does not exceed fifteen stones tron weight; but some of the larger sort, especially the bulls, average from thirty-five to forty-five stones. The circumstances of their breeding *in-and-in*, — of be-

ing chased so much when any of them are to be shot, — of being so frequently approached and disturbed by strangers, — and of having been exposed so long to all the vicissitudes of the seasons, and constantly browsing the same pasture, — have no doubt contributed greatly to the deterioration of the breed, and must have reduced them much in size and other qualities.

"The ancient history of this breed is involved in much mystery. From fossil remains, chiefly found in marl-pits, it appears that two species of the ox tribe formerly prevailed in Scotland, namely, the *Bos taurus* and the *Bos urus*. Some heads of these, of very large dimensions, are still preserved in the collections of the curious. Professor Fleming of Aberdeen informs us, that he has a skull of the former in his possession, measuring $27\frac{1}{2}$ inches in length, 9 inches between the horns, and $11\frac{1}{2}$ inches across at the orbits. The accounts of ancient authors certainly allude to a species of wild cattle very different in their characters and dimensions from those of the present day. The favourite haunt of these animals in ancient times seems to have been the Caledonia Sylva, or Caledonian Forest, which extended from Stirling, through Menteith and Stratherne, to Athol and Lochaber. It is described by old authors as dividing the Picts from the Scots; and, being well furnished with game, especially with fierce white bulls and kine, it was the place of both their huntings, and of their greatest controversies. Some say it took its

name from Calder, which signifies a *hazel*, or common nut-bush. The Roman historians delight much to talk of the furious white bulls which the Forest of Caledonia brought forth. In these early days, they are represented as of large size, and as possessing *jubam densam, ac demissam instar leonis;* or, as Holinshed has it, 'crisp and curled manes like feirs leonis.' At what period this great forest was destroyed, and the white cattle extirpated, is uncertain. Sir Robert Sibbald describes them, in his time, as denuded of their manes. In the sixteenth century, they seem to have become entirely extinct as a wild race, and, as we learn from Gesner, 'were all slain, except in that part which is called Cummernad.' Another author informs us, that 'thocht thir bullis were bred in sindry boundis of the Colidin Wod, now be continewal hunting and lust of insolent men, they are destroyit in all parts of Scotland, and nane of them left but allenerlie in Cumernald.' At what period the present breed were introduced to the royal chase at Cadzow, cannot now be well ascertained. It is well known that the Cummings were at one period proprietors of Cadzow and Cumbernauld, and it is likely that in their time the white cattle were in both places. But be that as it may, they have long been extirpated at Cumbernauld, while they have been preserved in great perfection at Hamilton. The universal tradition in Clydesdale is, that they have been at Cadzow from the remotest antiquity; and the probability is, that they are a part

remaining of the establishment of our ancient British and Scottish kings. At present they are objects of great curiosity, both to the inhabitants and to strangers visiting the place. During the troubles consequent on the death of Charles I., and the usurpation of Cromwell, they were nearly extirpated; but a breed of them having been retained for the Hamilton family, by Hamilton Dalzell, and by Lord Elphingstone, at Cumbernauld, they were subsequently restored in their original purity. A tradition prevails in the country, that, about a hundred years ago, when it was found necessary, for a time, to remove them from one pasture to another, several hundred individuals, belonging to the different baronies on the ducal estate, were called out, and that they only effected their purpose with much danger and difficulty. Instances are recorded of their having been taken when young, and tamed, and even milked. The milk, like that of most white cattle, is described as thin and watery. The usual number of ribs is thirteen on each side; some have been slaughtered with fourteen pair of ribs, but this is exceedingly rare. There is no other park of cattle in Scotland of a similar description."

In Chillingham Park they roam at large, and there is between 1500 and 1800 acres enclosed, combining, besides good pasture, a range of wild and rocky moor, interspersed with abundant wood and cover for their shelter, and approaching as near as any enclosure can do to the wild nature of their ori-

ginal habitation. From sixty to eighty head are kept up here, a certain proportion being regularly destroyed, to prevent the increase of the breed beyond their means of support. About two-thirds of the stock may be cows, the remainder bulls and oxen. When becoming too numerous, they are killed, and used as beef, which is nearly similar in taste and flavour to that of the common kyloe. The colour of this stock is white, with red ears; and they generally reach from fifty to sixty stones in weight. The oxen feed heavier, and in shape and form approach near to the Lancashire breed, the horns being long, and beautifully turned. A few years ago, a fine ox was fed to a large size, and was quite tame and gentle. The present keeper of the park at one time possessed a cow, which he had taken when a calf, in consequence of the death of its mother: it was gentle, and milked as a cow, bred freely with the common bull; but the propagation was not allowed to proceed farther, the calves being killed at an early age.

They go in herds, and on the approach of a stranger, after standing to gaze, like many other wild animals, wheel round him in a circle, which, if he is so imprudent as to remain, will be gradually narrowed, till an attack is made. During the breeding-season, it is more dangerous to approach, as the calls of the young will always incite the parent or herd to attack the aggressor. When pursued or baited, they become very fierce, as they also do if but slightly

wounded by a ball. Lord Ossulton had a narrow escape from a bull which had been wounded and separated from the herd. It attacked him on horseback, and, at the first onset, overthrew and gored the horse to death. One of the keepers was also tossed, and severely maimed by a wounded bull.

The other parks where this breed was kept up, were at Wallaton in Northamptonshire, Gisburne in Craven, Yorkshire, Limehall in Cheshire, Chertley, Staffordshire, Burton-Constable, Yorkshire, and Drumlanrig, Dumfriesshire. At the two latter places they have worn out, or have been destroyed by some means, neglect or disease*; and we possess no very recent information regarding the stock in the other parks.

The mode of killing these cattle, Mr Bewick remarks, "was perhaps the only modern remains of the grandeur of ancient hunting. On notice being given that a wild bull would be killed on a certain day, the inhabitants of the neighbourhood came mounted, and armed with guns, &c. and sometimes to the amount of an hundred horse, and four or five hundred foot, who stood upon walls, or got into trees, while the horsemen rode off the bull from the rest of the herd, until he stood at bay; when a marksman dismounted, and shot. At some of these huntings, twenty or thirty shots have been fired before he was subdued. On such occasions the bleeding victim

* The stock at Chillingham was once reduced to a single cow in calf. The produce fortunately proved a bull.

grew desperately furious, from the smarting of his wounds, and the shouts of savage joy that were echoing from every side." *

The races which have spread over Asia have been thought partly to have been mixed with some of the Indian breeds which are at present little known.

Among the largest domestic breeds known are those of the Kirguise and Calmuc Tartars, and those of the Roman States. The colour is generally of a bluish-ash, the horns remarkably ample and spreading. In Egypt a large white breed was maintained; and in northern and central Africa, according to Major Denham, two varieties at present exist, both humped, like some of the Indian breeds, the one with small horns, the other of a large size, with immense horns, one which was measured being three feet six inches and a half in length, following the curve, and twenty-three inches and a quarter in circumference.† Upon the banks of Lake Tchad, and in the kingdom of Bournou, these cattle were kept in great abundance. They performed all the laborious business at home of carriage and tillage, the camel only being used for war and extensive journeys. They were the bearers of all grain and other articles to and from the markets. " A small saddle of plaited rushes

* Bewick's Quadrupeds, p. 41.]

† Denham's Narrative, Appendix.

is laid on him, when sacks made of goat skins, and filled with corn, are lashed on his broad and able back. A leather thong is passed through the cartilage of his nose, and serves as his bridle, while on the top of the load is mounted the owner, his wife or his slave." *

Major Smith is of opinion, that the ordinary Egyptian white and spotted breed without humps has spread southward to Caffraria; and we find there, and among the Hottentots, where, as among the Cape colonists, they may now have a mixture with many of the Dutch breeds, cattle of very large size, and ample horns, † of a white or light colour, and marked with large blotches of reddish or brown. Here, besides the ordinary economical uses, they are employed by the Caffrarians as beasts of burden, often transporting their whole families, house and arms and utensils. The annexed Plate from Daniel's African Scenery, will illustrate both the breed and manner of travelling.

* Denham's Travels, p. 321.

† A horn from South Africa in our possession measures 21 inches in circumference at the base, and has apparently not been cut close to the skull.

SOUTH AFRICAN CATTLE,

WITH CAFFRARIAN FAMILY ON A JOURNEY.

PLATE XXV.

THIS interesting Plate is thus described in Daniel's African Scenery :—

" The Caffres who dwell upon the eastern coast of South Africa are a race of people very superior to what they have usually been considered, both with regard to their physical and moral character. If taken in the mass, it may be questioned if any nation can produce so great a proportion of tall elegant figures as appear among the Caffres. Though strong and active in a great degree, they eat very little animal food, but subsist chiefly on milk in a curdled state, and a few wild vegetables and roots. The shape of the head and the features of the countenance approach much nearer to inhabitants of the north than either the Hottentot or the Negro, and were it not for their colour, which is from black to bronze, even Europeans might pronounce them a very handsome race of men. Their weapons for war and for hunting are the hassagai and the kerie. The former is an iron spear fitted to a tapering shaft,

PLATE 25
CAFFRARIAN FAMILY TRAVELLING.

which they hurl with effect to the distance of thirty or forty yards. In battle they usually break off the wooden shaft of the spear, and with the aid of a shield made of dried ox-hides, come to close quarters with the iron part only in their hand. The kerie is nothing but a small stick with a round knob at the end, with which they frequently kill the pigmy antelope, hares, and the smaller animals. The men in summer go naked. Their usual ornaments consist of rings of ivory on the arm, a brush of hair attached to the head, and frequently a cow's tail tied to the knee; and when they go to war, they bind on the head, by a fillet of skin, the two wings of the Numidian Crane. The women wear long cloaks of skin, made soft and pliant with great pains, and gaily studded with metal buttons. The Caffre chiefs also wear cloaks made of the skins of animals, and generally prefer those of the leopard and tiger cat. The children always go naked, and have no decorations except a tuft of hair from the spring-bok, with which their heads are frequently ornamented."

In India we have another race of oxen which has been also referred to the same stock as our domestic breed, chiefly from the correspondence of the skeleton, and the similar flat form of the skull.

PLATE 26.

J.Stewart del.

INDIAN OX OR ZEBU.
Marechall.

THE INDIAN OX OR ZEBU.

Taurus Indicus.

PLATE XXVI.

Zebu, *Buffon*, *Desmarest.*—Bos Indicus of Authors.

THE Zebu seems to extend in its varieties over India and Northern Africa, and we believe the previously noticed animals from the kingdom of Bornou will be referable to one of these. The general colour of the Zebu is ashy grey, paler towards the lower parts, but varieties very commonly occur. The size runs from that of a large mastiff dog to a large and powerful bull of Europe, and they occur either horned or without horns, and sometimes with the horns, as it were, attached only to the skin, hanging loose and without any central core; while there is another race, however, in greater obscurity, of a large size, and having the horns nearly four feet in length. The ordinary varieties of the Zebu are furnished with a fatty hump or excrescence on the shoulders, which has been said to reach the weight of fifty pounds. Another variety has two fatty humps, the first placed on the shoulder, the other immediately behind it; these are said to be most common in

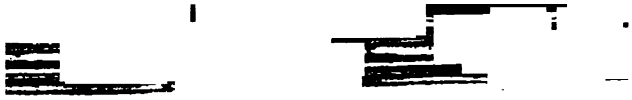


PLATE 26.

J. Stewart del.

INDIAN OX OR ZEBU.

the vicinity of Surat. The variety we have figured is of large size, the horns small, and the ears large and rather pendulous.

In India, where they have not been consecrated, they are used for burden and tillage, and are mild-tempered and gentle. They are also used occasionally for the saddle and in harness, and travel with considerable speed, from twenty to thirty miles being accomplished in a day. Among the Hindoo sects they are consecrated, and as with many other of the animals employed in the mythology of that remarkable people, are fed and pampered and allowed to use their freedom anywhere with impunity, severe penalties being inflicted on any one who will molest them, even when destroying their growing crops or other property.

"The Brahminy, or sacred bull of the Hindoos, rambles about the country without interruption; he is caressed and pampered by the people, to feed him being deemed a meritorious act of religion. In many parts of Bengal, an absurd custom prevails, which frequently occasions much damage to the farmers. When a rich young man dies, and the ceremony in commemoration of ancestors has been performed, a young bull is consecrated, with much solemnity, to Siva, and married to four cows; he is then turned loose, after having been marked; he may then go where he pleases, and it is not lawful to beat him, even if he be eating a valuable crop, or enter a shop and there devour the grain exposed for sale. The

sufferers shout and make a noise, to drive him away; but he soon despises this vociferation, and eats heartily until he is satisfied. These consecrated bulls become in consequence of these free quarters very fat, and are fine animals to look at, but very destructive. The wives are given away to Brahmins, and he seldom sees them again. The two last Rajahs of Dinajepoor, among other expedients which they devised with great success to ruin themselves, consecrated in this manner about two thousand cows, and as no person presumed to molest the sacred animals, the vicinity soon became desolate, and the magistrate was at last compelled to sell them all, with the exception of one hundred, which were left to the widow to soothe her misfortune." *

These breeds have all the inward grunting call heard in the Yak and some other Indian animals, not the open bellow of the true bull, and this has led to the conjecture that there was some intermixture between the European domestic races and the wild animals of India.

The domestic breeds of cattle in Europe are extremely numerous, varying with the nature and climate of the district, according as their proprietors have desired an animal fitted for the dairy or the butcher. As in the sheep, they had not the improvement of the fleece to assist in the returns of profit, and

* Hamilton's Descript. of Hindostan.

where the quantity of milk and its products was not an object, the best form for bearing a good covering of fat, and the animal which would produce a fine beef, and in large quantity, at an early age, was the aim to which all the great breeders sought to attain; breeds for draught or burden in this country at least having been nearly superseded, and even on the Continent at last, coming to the public market, the above mentioned qualifications are deemed most desirable.

Desmarest enumerates twenty French and Dutch varieties or races, differing merely in the form, which has pleased the breeder. His *Bos lemovicensis* supplies the Parisian market chiefly. They are kept while young in the district of Perigord, and driven to Normandy to be fattened and prepared for the market. This breed is of a pale colour, generally white or tawny, strongly formed, with large bending horns; their weight from 600 lb. to 850 lb. Another, the Race Gasconne, *Bos aquitanicus*, feeds to nearly a similar weight, is also of a pale colour, and has the horns enormously large. These are consumed at Bourdeaux, and furnish the principal supply for the French navy. *B. avernus*, reared on the mountains of Auvergne, is employed at the age of about three years for tillage, and afterwards fattened. It is of strong proportions, yet does not reach a heavy weight. The colour is generally red or brown, and are short and point upwards. *B. viducassencis* reaches a large size, with large white but short horns, and round at the tips, blotched with red and white,

black and white, or black and red, considered by M. Desmarest as the finest breed in France, introduced from Holland, and used for tillage. Another large breed, *B. uneliensis*, when crossed with the last, reaches a weight of 1300 or 1400 lb., and is considered the largest in France. *B. Helveticus* is one of the Swiss races, celebrated for the quantity of their milk, and *B. Batavius* is the ordinary Dutch breed, celebrated for a similar good quality. Denmark possesses a breed also remarkable for milk, and in Spain and Italy the breeds have a fine appearance from their very large size, their peculiar dull grey colour, and their immense horns diverging laterally. We are not, however, so well informed as to their other qualifications.

In Britain the catalogue of varieties is even greater. At the earlier periods of its history grazing was much more prevalent in proportion than in the present time, and from the times of the ancient Britains to that of the border forays, the carcasses of the beeves were a regular item in the winter's larder. These, perhaps, might be taken from any stock without the true calculation of the quantity of meat a given time and feeding would produce, but they were, nevertheless, well fed on the natural pastures, and would be perhaps even more acceptable to the accomplished epicure in beef. With the march of cultivation, came the necessity of attending to the varieties which were most easily reared, and when the pasture lands began to yield so great a return by crops of grain, it

necessarily led to the attention for these requisites which have now been brought to such perfection. In the same manner which we pursued when noticing the natural history of the sheep, we have now selected two of the British breeds for illustration, as much contrasted as possible; the others we shall very shortly notice under them. About ten varieties are generally noticed, but there are more than double the number known locally, either by the name of the district or their original proprietors. The long-horned, the middle-horned, the short-horned, the Welsh breed, the Suffolk duns, Galloway polled breed, Highland or Kyloe breed, Lowland or Fife-shire breed, Alderney breed, and the wild breed, are those enumerated by Dickson.

But before proceeding to these details, we shall in this place give some account of the barbarous though stirring and heroic encounters of the Moors, Spaniards, and Romans in their bull-fights, widely contrasted as they are from the veneration in which we have just mentioned that other nations have held the animals at present under our notice. We have seen the natives of Egypt and of the East deifying these quadrupeds; and useful and peaceful as they are when unmolested, we must exhibit them tormented in a variety of ways, and with a cruelty which to our present habits seems almost incredible. The origin of bull-baiting is supposed to be derived from the Moors, and we cannot lay before our readers a more interesting account of these extraordinary exhibitions,

than the following characteristic translation from a Moorish ballad.

THE BULL-FIGHT OF GANZUL.*

I.

King Almanzor of Grenada, he hath bid the trumpet sound,
He had summon'd all the Moorish Lords, from the hills and plains around:
From Vega and Sierra, from Betis and Xenil,
They have come with helm and cuirass of gold and twisted steel.

II.

'Tis the holy Baptist's feast they hold in royalty and state,†
And they have closed the spacious lists beside the Alhamra's gate;
In gowns of black with silver laced within the tented ring,
Eight Moors to fight the bull are placed in presence of the King.

III.

Eight Moorish lords of valour tried, with stalwart arm and true,
The onset of the beasts abide come trooping furious through;
The deeds they've done, the spoils they've won, fill all with hope and trust,
Yet ere high in heaven appears the sun, they all have bit the dust.

IV.

Then sounds the trumpet clearly, then clangs the loud tambour,
Make room, make room for Ganzul—throw wide, throw wide the door;—
Blow, blow the trumpet clearer still, more loudly strike the drum,
The Alcaydé of Agalva to fight the bull doth come.

* From Ancient Spanish Ballads, translated by J. G. Lockhart, Esq.

† The day of the Baptist is a festival among the Mussulmans, as well as among Christians.

V.

And first before the King he pass'd, with reverence stooping low,
And next he bow'd him to the Queen, and the Infantas all a-rowe;
Then to his lady's grace he turn'd, and she to him did throw
A scarf from out her balcony was whiter than the snow.

VI.

With the life-blood of the slaughtered lords all slippery is the sand,
Yet proudly in the centre hath Ganzul ta'en his stand;
And ladies look with heaving breast, and lords with anxious eye,
But the lance is firmly in its rest, and his look is calm and high.

VII.

Three bulls against the knight are loosed, [and two come roaring on,
He rises high in stirrup, forth stretching his rejon;
Each furious beast upon the breast he deals him such a blow,
He blindly totters and gives back across the sand to go.

VIII.

"Turn Ganzul, turn," the people cry—the third comes up behind,
Low to the sand his head holds he, his nostrils snuff the wind;
The mountaineers that lead the steers, without stand whispering low,
'Now thinks this proud Alcaydé to stun Harpado so?"—

IX.

From Guadiana comes he not, he comes not from Xenil,
From Guadalarif of the plain, or Barves of the hill;
But where from out the forest burst Xarama's waters clear,
Beneath the oak trees was he nursed, this proud and stately steer.

X.

Dark is his hide on either side, but the blood within doth boil,
And the dun hide glows, as if on fire, as he paws to the turmoil.
His eyes are jet, and they are set in crystal rings of snow;
But now they stare with one red glare of brass upon the foe.

XI.

Upon the forehead of the bull the horns stand close and near,
From out the broad and wrinkled skull, like daggers they appear;
His neck is massy, like the trunk of some old knotted tree,
Whereon the monster's shagged mane, like billows curl'd, ye see.

XII.

His legs are short, his hams are thick, his hoofs are black as night,
Like a strong flail he holds his tail in fierceness of his might;
Like something molten out of iron, or hewn from forth the rock,
Harpado of Xarama stands, to abide the Alcaydê's shock.

XIII.

Now stops the drum—close, close they come—thrice meet, and thrice give back;
The white foam of Harpado lies on the charger's breast of black—
The white foam of the charger on Harpado's front of dun—
Once more advance upon his lance—once more, thou fearless one!

XIV.

Once more, once more;—in dust and gore to ruin must thou reel—
In vain, in vain thou tearest the sand with furious heel—
In vain, in vain, thou noble beast, I see, I see thee stagger,
Now keen and cold thy neck must hold the stern Alcaydê's dagger!

XV.

They have slipp'd a noose around his feet, six horses are
brought in,
And away they drag Harpado with a loud and joyful din.—
Now stoop thee, lady, from thy stand, and the ring of price
bestow
Upon Ganzul of Agalva, that hath laid Harpado low.

"The excessive fondness of the Spaniards for bull-fights is a remarkable feature in their manners, and is hostile to the feelings of other European nations, who are less familiar with such sights. The Spaniards themselves regard this practice as the means of preserving energy of character, and of habituating them to strong emotions, which are only terrible to timid minds. In these sentiments the Spaniards are not singular; for it may be recollected that an enlightened legislator, the late Mr Windham, attempted to defend on the same principles the equally cruel sport of bull-beating in England, when a proposal was made for a legal enactment to suppress that barbarous practice. But although bull-fighting was formerly reckoned among the royal festivals in Spain, attempts have been made, if not entirely to abolish the entertainment, at least to diminish the number of the exhibitions.

"These bull-fights are attended with very considerable expense, but they are also profitable to the undertakers; for the spectators pay for admission as to any other spectacle, and the price of the best and most commodious seats is as high as a dollar. The profits which remain after defraying the expense of

the horses and bulls, and the wages of the *torreadores* or combatants, are destined to charitable purposes. In some cities the principal square is fitted up as a kind of theatre for this exhibition.

"The spectacle begins with a kind of procession round the square, in which the combatants, either on foot or on horseback, make their appearance; after them two officers of justice in black robes, and of a grave deportment, advance to the president of the spectacle, and request to have an order for the entertainment to commence. A signal is then given, and the animal, which had been previously shut up in a cabin, with a door opening to the square, rushes forward, and is received by the spectators with the loudest acclamations. The *picadores*, or combatants, on horseback, dressed in the ancient Spanish manner, and armed with a long lance, begin the contest; and if the bull, without provocation, dart upon them, a favourable opinion is entertained of his courage; and if, after being wounded and repulsed, he return to the charge, the most enthusiastic expressions of joy are heard; but if he is struck with terror, and seem anxious to avoid his antagonists, he is hooted and hissed by all the spectators, and loaded with reproaches and blows by those who are near him. If after all this his courage cannot be roused, large dogs are let loose against him, and after being torn and mangled, in the estimation of the Spaniards he perishes ignobly. The most animated, as well as the most bloody scene, is exhibited with the combatant

on horseback; for the irritated and wounded animal sometimes attacks and overturns both horse and rider; and when the latter is dismounted and disarmed, he is protected from immediate danger by the combatants on foot, who endeavour to provoke and divert the bull's attention by shaking before him pieces of cloth of different colours; but in attempting to save the dismounted horseman, they are themselves exposed to great hazard; for the bull sometimes pursues them, when they escape by dropping a piece of coloured stuff, against which the deceived animal exerts all his rage; or, if this resource fail, the combatant springs over a barrier six feet high, which incloses the inner part of the arena. In some places this barrier is double, forming in the intermediate space a circular gallery, behind which the combatant is in safety; but in some cases the barrier is single, and the bull succeeds in his attempt to surmount it when an indescribable scene of consternation and confusion immediately follows, which proves fatal to many of the spectators, while the unfortunate animal falls under the blows which are levelled at him from all sides.

"If the animal is not dispatched by those on horseback, and if he seem disposed to renew the combat, they retire and give place to the *banderilleros*, who are on foot, and presenting themselves before the animal, the moment he darts upon them, plunge into his neck a kind of hook-darts, ornamented with small streamers of coloured paper. The rage of the animal

is raised to the highest pitch, and, were it not for the experience and skill of the assailants, his furious efforts would hurl destruction on their heads in a moment. The bull being exhausted with numerous wounds and loss of blood, another victim of barbarous sport is demanded; the signal of death is given by the president, and announced by the sound of trumpets. The matador then appears in the arena, when the other combatants retire. In one hand he holds a long dagger, and with the other waves a flag before his adversary. The interest and pleasure of the spectators, which had been suspended, are again awakened, and the matador, watching the favourable opportunity, inflicts the mortal blow; and if the animal fall, the loudest shouts of acclamation announce the triumph of the conqueror; but if he fail in the first attempt, a murmur of disapprobation pervades the assembly. The fallen animal is then dragged from the arena by three mules ornamented with bells and streamers, and another is immediately introduced to run the same course of barbarous torment. At one period six bulls were thus sacrificed in a morning, and twelve in the afternoon, on the days appropriated to these entertainments in Madrid." *

According to Gibbon, the Romans, about the decline and fall of the empire, borrowed this barbarous practice from the Moors.

"In the year 1332, a bull feast, after the fashion of the Moors and Spaniards, was celebrated in the Co-

* Encyclopædia Edinensis.

liseum itself; and the living manners are painted in a diary of the times.* A convenient order of benches was restored; and a general proclamation, as far as Rimini and Ravenna, invited the nobles to exercise their skill and courage in this perilous adventure. The Roman ladies were marshalled in three squadrons, and seated in three balconies, which, on this day, the 3d of September, were lined with scarlet cloth. The fair Jacova di Rovere, led the matrons from beyond the Tiber, a pure and native race, who still represent the features and character of antiquity. The remainder of the city was divided as usual between the Colonna and Ursini. The two factions were proud of the number and beauty of their female bands. The charms of Savella Ursini are mentioned with praise; and the Colonna regretted the absence of the youngest of their house, who had sprained her ancle in the garden of Nero's tower. The lots of the champions were drawn by an old and respectable citizen; and they descended into the arena or pit to encounter the wild bulls, on foot, as it should seem, with a single spear. Amidst the crowd, our annalist has selected the names, colours and devices of twenty of the most conspicuous knights. Several of the names are the most illustrious of Rome and the ec-

* This extraordinary bull feast in the Coliseum, is described from tradition rather than memory, by Ludovico Buonconte Monaldesco, in the most ancient fragments of Roman Annals (Muratori, Script. Rerum Italicarum, tom. xii. p. 535, 536); and however fanciful they may seem, they are deeply marked with the colours of truth and nature.

clesiastical state; Malatesta, Polenta, della Valle, Cafarello, Savelli, Capoccio, Conti, Annabaldi, Altieri, Corsi. The colours were adapted to their taste and situation; the devices are expressive of hope or despair, and breathe the spirit of gallantry and arms. "I am alone like the youngest of the Horatii," the confidence of an intrepid stranger. "I live disconsolate," a weeping widower. "I burn under the ashes," a discreet lover. "I adore Lavinia or Lucretia," the ambiguous declaration of a modern passion. "My faith is as pure," the motto of a white livery. "Who is stronger than myself?" of a lion's hide. "If I am drowned in blood, what a pleasant death," the wish of ferocious courage. The pride or prudence of the Ursini restrained them from the field, which was occupied by three of their hereditary rivals, whose inscriptions denoted the lofty greatness of the Colonna name: "Though sad, I am strong:" "Strong as I am great:" "If I fall," addressing himself to the spectators, "you fall with me;" intimating (says the contemporary writer) that while the other families were the subjects of the Vatican, they alone were the supporters of the capitol. The combats of the amphitheatre were dangerous and bloody. Every champion successively encountered a wild bull; and the victory may be ascribed to the quadrupeds, since no more than eleven were left on the field, with the loss of nine wounded, and eighteen killed, on the side of their adversaries. Some of the noblest families might mourn, but the

pomp of the funerals, in the churches of St John Lateran and St Maria Maggiore, afforded a second holiday to the people. Doubtless, it was not in such conflicts that the blood of the Romans should have been shed, yet, in blaming their rashness, we are compelled to applaud their gallantry: and the noble volunteers, who display their magnificence, and risk their lives, under the balconies of the fair, excite a more generous sympathy than the thousands of captives and malefactors who were reluctantly dragged to the scene of slaughter.†

In Britain, similar exhibitions appear not to have been without their admirers; and we find bull-baiting and bull running patronised by royalty amongst us, and these shows even graced by the presence of the softer sex.

Queen Elizabeth, on the 25th of May 1559, soon after her accession to the throne, gave a splendid dinner to the French ambassadors, who afterwards were entertained with the baiting of bulls and bears, and the queen herself stood with the ambassadors looking on the pastime till six at night. The day following, the same ambassadors went by water to Paris Garden, where they saw another baiting of bulls and of bears; and again, twenty-seven years posterior, Queen Elizabeth received the Danish ambassador at Greenwich, who was treated with the sight of a bear and bull-baiting, "tempered," says

† Gibbon's Decline and Fall of the Roman Empire, vol. xii. p. 416–418.

Holinshed, "with other merry disports; and, for the diversion of the populace, there was a horse with an ape upon his back, which highly pleased them, so that they expressed "their inward-conceived joy and delight with shrill shouts and variety of gestures."

The manner in which these sports were exhibited toward the close of the sixteenth century, is thus described by Hentzner, who was present at one of the performances. "There is a place built in the form of a theatre, which serves for baiting of bulls and bears; they are fastened behind, and then worried by great English bull-dogs; but not without risk to the dogs, from the horns of the one and the teeth of the other; and it sometimes happens they are killed on the spot. Fresh ones are immediately supplied in the places of those that are wounded or tired."

Bull-running at Stamford was another barbarous diversion somewhat different from bull-baiting, and much less known. The traditionary origin of the bull-running at Stamford, and the manner in which it was performed in the seventeenth century, are given by Butcher, in his Survey of that town. "The bull-running is a sport of no pleasure, except to those who delight in beastliness and mischief; it is performed just the day six weeks before Christmas. The butchers of the town, at their own charge, against the time provide the wildest bull they can get. This bull over night is led into some stable or barn belonging to the alderman. The next morning proclamation is made by

the common bellman of the town, round about the same, that each one shut up their shop-doors and gates, and that none, upon pain of imprisonment, offer to do any violence to strangers; for the preventing whereof, the town being a great thoroughfare, and then being term-time, a guard is appointed for the passing of travellers through the same, without hurt; that none have any iron upon their bull-clubs, or other staff, which they pursue the bull with. Which proclamation made, and the gates all shut up, the bull is turned out of the alderman's house; and then hivie-skivy, tag and rag, men, women, and children, of all sorts and sizes, with all the dogs in the town, promiscuously running after him with their bull-clubs, spattering dirt in each other's faces, that one would think them to be so many furies started out of hell for the punishment of Cerberus, &c. And which is the greater shame, I have seen persons of rank and family, of both sexes, following this bulling business. I can say no more of it, but only to set forth the antiquity thereof as tradition goes."*

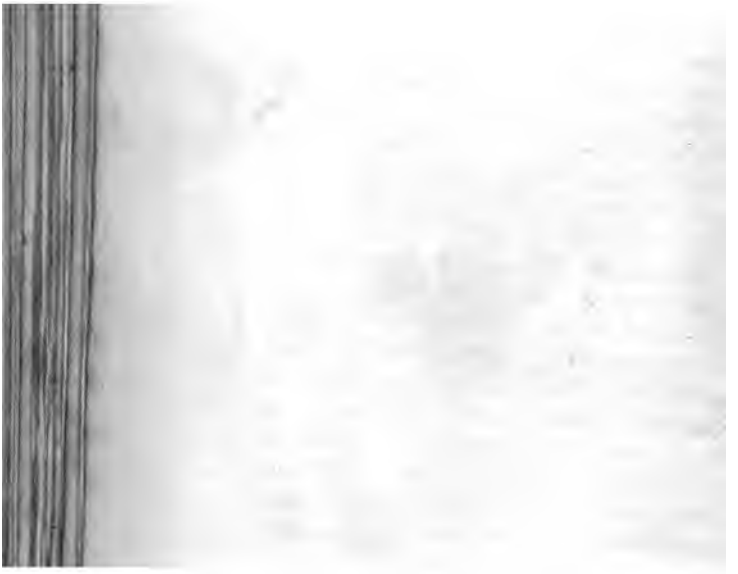
We shall now illustrate the British breeds first, by

* Strutt's Sports and Pastimes of the People of England.

THE SHORT-HORNED BREED.

PLATE XXVII.

THE Short-horned British breed of cattle, so termed in contradistinction to other breeds, where the horns are long and ample. They are principally found in Lincolnshire, the eastern parts of Yorkshire, Durham, Northumberland, and Berwickshire, are still extensively bred in these countries, have extended in both directions, and are now commonly found in the south of Scotland. They are originally from a Dutch stock, and sometimes bear that appellation. They are a handsome breed, compact, yet elegant, should have smooth skins and thin hides, and have often a pleasing arrangement of blended colours of red and white, and a sort of roan, which sometimes almost appears purple. They feed easily, and to a large size, and are now prized as being capable of rearing to a heavy weight at a very early age. They feed in common to from 60 to 100 stones' weight, and a few examples are recorded of 140 and 150 stones being exceeded. They are also most extensively used for the dairy, yielding abundant quantity



of milk, though it is supposed by some to be of rather an inferior quality. It is, however, in repute for its produce of butter, for the Yorkshire firkin-butter, of the London markets, is supplied by this breed.

The *long-horned breed* is deeper in the fore-quarter, and lighter behind, rather inferior to the short-horned in size, of a thick and firm hide, long hair, and remarkable for their long horns. Lancashire is the mother country of this breed, which is most frequent in Warwickshire, Leicester, Gloucester, Chester, and other midland counties, but it is supposed to be in the highest perfection in Leicestershire. They are rather slow feeders, although there are some improved breeds, which feed more quickly.

The *middle-horned cattle* are only a variety. They are reared in Devonshire, Sussex, and Herefordshire. The first, when in a state of purity, are of a high red colour, are thin-skinned, and silky in handling. They feed early, are adapted for draught, and the shoulder points, according to Mr Culley, are beautifully fitted for the collar. As dairy cattle they are also esteemed, and, from their being steady and active, as well as capable of great exertion in harness, they are peculiarly adapted for the purposes of the team. They may be wrought from three to five or six years' old before they are fattened; altogether they are a very valuable breed.

The *Welsh cattle* are small, active, and hardy,

black, with thick horns turned upwards. They are quick feeders.

The *Suffolk duns* are a small breed reared in that county principally, and supposed by Mr Culley to be a variety occasioned by an intercourse with the northern droves. They are a polled breed, or without horns; the colour *dun*, but it commonly varies. They are esteemed for the dairy.

The *Alderney breed* is a very pretty and handsome race, finely made, and with slender limbs. They are of a light reddish or yellow colour, sometimes black, but are impatient of the cold of this climate, and do not thrive unless with extra care and keeping. They are kept for the richness of their milk. In many places a cross between some of our hardy smaller races has been found useful, and they then bear the climate of this country.

Galloway polled breed, as their name implies, is originally from Galloway, a rather wild district in the south of Scotland. They are now the most common cattle in that district and Dumfriesshire, where they are reared and grazed from two to four years old, at which period they are driven to the Norfolk, Suffolk, and some other Southern markets, to be farther fed; whence they reach Smithfield, and the other London markets, and there yield a high price from the superior quality of the beef.

The prominent feature in this breed is the want of horns; a peculiarity which is very striking to an

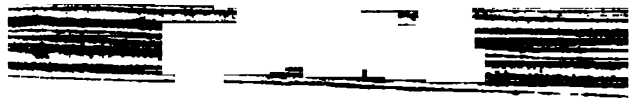
individual accustomed to a district where a horned breed is reared. They are remarkably neat, strong, compact animals. The favourite and common colour is black, but red or dun brindled and pied colours are sometimes met with. The hair is rather long, but it should be close, fine, and silky. The last breed we shall notice is

THE KYLOE OR HIGHLAND CATTLE.

PLATE XXVIII.

This, like the Black-faced Sheep, possesses the whole of the Highlands and the Western Isles of Scotland. On their native pastures, where they are not housed, they are extremely rough and shaggy, and wild-looking; but, when driven to the Lowlands, they become more polished, and, on a richer pasture, in a warmer climate, and with shelter at night, shew a rich and glossy covering, and a considerable degree of symmetry, uniting, at the same time, a firmness and compactness of limb and body. The favourite colour here is also black; but nearly the same varieties as of the last are prevalent. It is a horned breed, and the horns should be round, polished, and white at the base, in an animal of high health and vigour. Immense droves of this breed pass annually to the south, where they are fed and supplied to the London markets. They are easily fed, and afford rich and excellent beef. The smallest breeds are reared in the Isle of Skye.

These varieties, which we have now shortly enumerated, are the principal which are reared in this



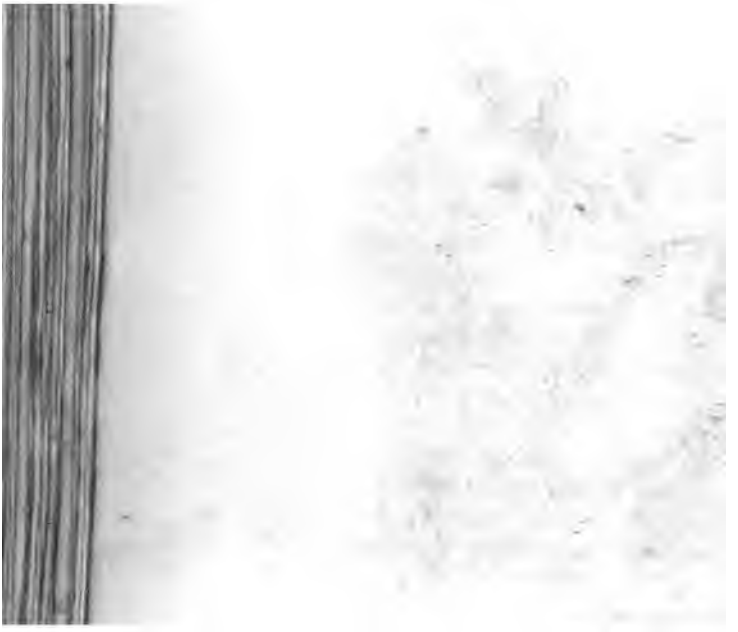
BRITISH KYLOE.

country; but there may be more than double the number which have local names applied to them, from their locality or breeder, all having at least some supposed qualification for which they are reared.

The actual consumption of black cattle in London alone in 1832, amounted to 1,364,160, and, besides the immense quantity of animal food which they afford, the different articles to which their various parts are applied and manufactured into, are almost incredible.—Leather of different kinds is prepared from the hides, after the hair has been removed, and put aside for the use of the plasterer, &c.; glue from the refuse; vellum from the skins of the calves. Tallow is a well known article, so is horn, in its various applications; the blood is not so commonly known as an article extensively used in the clarifying of sugar, and as the basis of Prussian blue; while the common and useful gold-beaters' skin is not generally understood to be the lining of their intestines. With all those useful properties, both in a living state and after death, it is singular that in civilized nations this useful and commonly mild-tempered animal should be sometimes treated with the utmost cruelty. The old English practice of bull-baiting, which we have already given an account of on pp. 227–8, exhibits an example of this in Britain, and is curious to contemplate, in relation with the manners of our people, and to contrast with its more luxurious analogy the bull-fights of Spain.

PLATE 29.

THE AFRICAN BUFFALO.



THE AFRICAN BUFFALO.

Bubalus cafer.—Smith.

PLATE XXIX.

Bos cafer, *Sparrman*, &c.

The Buffalo of the Cape has often been confounded with the animal of Southern Europe; but it is entirely of a different form, and is a much more ferocious and dangerous animal, and has never yet been domesticated, or used for any laborious purpose. It is an animal, Burchel remarks, found no where but in the extra tropical part of Southern Africa, and is widely distinct from every other species of the ox tribe, and most remarkable by its horns, which, though not of more than ordinary or proportional length, are so unusually broad at their base, as to cover the whole forehead, and give to it the appearance of a mass of rock; an appearance to which the ruggedness and unevenness of their surface greatly contribute. Its countenance exhibits a savage and malevolent expression. Its bulk far exceeds that of the ox, although its height be not much greater; but it is altogether more robust and strongly made. Its muzzle, when not young, is but thinly covered with short scattered black hair; that on the under lip, and about the corners of

mouth, being longer, and somewhat resembling a beard. The wither rises high, but not sufficiently to form a rump. The tail resembles that of the common ox, but is much shorter; and the two spurious hoofs are rather longer in proportion. Its horns turn outwards and downwards, and their points are recurved upwards. The hide is much thicker than that of the ox, and is much valued by the Colonists and Hottentots for its strength. It is of a fierce and treacherous disposition, which, added to its size and strength, renders it dangerous to be attacked without caution, or without the certain means of escape at hand.*

The frame of this animal is strong and powerfully made, and the species is at once distinguished by the immense mass of horn which defends the forehead. According to Lichtenstein, the rib-bones are of such extraordinary breadth, that they almost unite with one another, so that on the outer side nothing at all is seen of the intercostal muscles. †

The African Buffalo is found in abundance in Southern Africa, and stretches along the east coast as far to the interior as has been yet explored. In the colony of the Cape, it is, however, becoming much less plentiful, from the constant warfare kept up against it as well as the other wild animals, and travellers now may look in vain for any fine specimens in the places where they were seen and hunted by

* Burchell's Africa, ii. 250.

† Lichtenstein's Travels, ii. 276.

Le Vaillant, Sparrman, or Daniel. All travellers have agreed in the danger of wounding, or intruding incautiously upon the haunts of the buffalo; he is easily irritated, and rushes towards his object with blind fury, bearing down all before him; he possesses also great activity, and in some situations considerable swiftness; and in an attack upon a herd, a place of safe retreat is generally looked for before commencing. They are killed in pitfalls, like much of the larger game, but the Dutch colonist or European makes use of the rifle alone, while the Hottentot prefers following this chase on foot, being more active then the animal in seeking a retreat from his pursuit. Mr Pringle relates the following incident of a buffalo hunt, which we extract, as characteristic of the animal and the sport.

"A party of boors had gone out to hunt a herd of Buffaloes, which were grazing on a piece of marshy ground, interspersed with groves of yellow wood and mimosa trees, on the very spot where the village of Somerset is now built. As they could not conveniently get within shot of the game without crossing a part of the *valei* or march, which did not afford a safe passage for horses, they agreed to leave their steeds in charge of their Hottentots, and to advance on foot, thinking that if any of the buffaloes should turn upon them, it would be easy to escape by retreating across the quagmire, which, though passable for man, would not support the weight of a heavy quadruped. They advanced accordingly, and under

covert of the bushes, approached the game with such advantage, that the first volley brought down three of the fattest of the herd, and so severely wounded the great bull leader, that he dropped on his knees, bellowing furiously. Thinking him mortally wounded, the foremost of the huntsmen issued from the covert, and began reloading his musket as he advanced to give him a finishing shot; but no sooner did the infuriated animal see his foe in front of him, than he sprang up and rushed headlong upon him. The man throwing down his heavy gun, fled towards the quagmire; but the beast was so close upon him, that he despaired of escaping in that direction, and turning suddenly round a clump of copse wood, began to climb an old mimosa tree which stood at the one side of it. The raging beast, however, was too quick for him, bounding forward with a roar, which my informant described as being one of the most frightful sounds he ever heard; he caught the unfortunate man with his terrible horns, just as he had nearly escaped his reach, and tossed him into the air with such force, that the body fell dreadfully mangled into a cleft of the tree. The buffalo ran round the tree once or twice, apparently looking for the man, until weakened with the loss of blood, he again sunk on his knees. The rest of the party recovering from their confusion, then came up and dispatched him, though too late to save their comrade, whose body was hanging in the tree quite dead."*

* Pringle's African Sketches, p. 271.

Major Smith has placed next in order, an animal of which we have at present no distinct account. It appears pretty certain that there exists in central and unexplored Africa, a rather large Bovine animal, for we have indications of it by various travellers, which do not agree with any of the known species. Major Smith met with a drawing in the collection of Prince John Maurice of Nassau, which bears some appearance of being drawn from this animal. The description of the drawing, a young male, is as follows; but that is all we yet know regarding an animal which may prove of considerable interest. "A young male, the horns lying across the summit of the head; the tips turned up; colour darkish, with obscure transverse ridges; head very short, thick, abrupt at the nose; forehead wide; eyes large and full; neck with a dense mane; ears long, flaccid, pendulous; tail to below the houghs covered with long woolly black hair; general colour deep brown, feet white. Inhabits Congo, Angola, and central Africa."*

The late Caffre wars have increased the scarcity of all large game; and letters from the outposts of the new territory describe the country as totally forsaken, the herds of large animals being driven off to seek quiet and retirement.

Another animal, which is yet little known, stands in our systems under the title of *Bos pegasus*. The

* Griffith's Synopsis.

colour is deep brown, the feet white, neck with a dense mane, the ears long and pendulous; the horns lying across the summit of the head, with the points turned up. Inhabits Congo, Angola, and central Africa.*

* Major Smith.

THE ARNEE OX.

The Arnee Ox, *Bubalus Arnee*, Smith, is the next animal we have to notice, remarkable in many instances, but particularly for the immense development of the horns, of enormous weight, and forming a curve rising erectly from the side of the head. This animal is a native of China and India; and from the evidence given by Major Smith, it appears pretty certain that there are two species, or at all events, several very distinct varieties. The one inhabiting Bengal is rather common, of moderate size, and has the horns above three feet in length. The other is found in small families in the forests at the foot of the Himalayas; and it is thought that the animal met with by Colonel Williamson in one of his hunting excursions, must be referred to this, and not to the True Wild Buffalo, to which the title *Arnee* is sometimes applied, as signifying an ox of very large dimensions. This animal is described as having a dark nearly black skin, scantily furnished with hair, the skin appearing and shewing the actual colour of the animal, as in the case of many of the ruminant animals inhabiting a very warm climate, many of the African Antelopes, &c. This buffalo (as it is termed

by Williamson) measured above six feet high at the shoulder, and nearly a yard in breadth at the chest, and the horns were above five feet and a half in length.

Major Smith mentions another killed to the eastward of Bengal, whose head, when resting perpendicularly on the ground, required the out-stretched arms of a man to hold the points of the horns. Another pair of horns in the British Museum, measured by the same author, were six feet three inches in length, following the curve, and eighteen inches in circumference at the base.

INDIAN OR DOMESTIC BUFFALO.

Bubalus buffus.

Bos bubalus of Authors, *Smith*, &c.—Buffle, *Buffon*, *Fred. Cuvier*, *Hist. Nat. des Mammif.*

THIS animal exists in a wild state in many parts of India, and those in Persia, North Africa, and the south of Europe are used as domestic animals, performing labour and carriages, for which purposes they are managed by a ring through the cartilage of the nose. There is, however, something treacherous and designing in its look and appearance, and among the herds of India there always appears a certain jealousy of strangers, and especially of Europeans, whom they view with a suspicious glance, and not unfrequently attack without any warning.

The colour of the domesticated animal is generally dark, the hair scattered and coarse, the horns large, reclining backward and sideways, with the tips turned up. With ample feeding and care the tame buffalo becomes a fine animal, sleek and fine-coated, and possessing great spirit and courage. Such are the animals which are picked and trained by the great to exhibit in the contests with the tiger or elephant. The European domestic race exceed in size

those of India, except such as are chosen for the combat, and stand from four to five feet high at the shoulder.* The wild animal is of larger proportions. We are indebted to Colonel Williamson for interesting information regarding both the tame and the wild states, which we shall here make use of.

The Indian buffalo delights in water, so much so that burdens have to be most carefully attended to in travelling, the animals most probably being inclined to lie or roll themselves in the first swamp or water they meet with. No place seems to delight them more than the deep verdure on the confines of pools and marshes, especially if surrounded by tall grass, so as to afford concealment and shade while the body is covered by the water. In such situations they appear to enjoy a perfect ecstasy, having in general nothing above the surface but their eyes and nostrils, the horns being kept low down, and consequently out of sight. Frequently nothing is perceptible but a few black lumps in the waters, appearing like small clods, and a passenger would scarcely expect to see, as often happens, twenty or thirty great beasts suddenly rise. The banks of the Ganges and Cozzimbazar Island have long been favourite haunts of the wild buffalo. They are

* Major Smith is in doubt whether or not the Arnee of India may be the stock from which the domestic races of Buffaloes have sprung; and in Colonel Williamson's Field Sports, the True Arnee is sometimes confounded with the Buffalo.—*See Arnee*, p. 241.

hunted with elephants in the same manner as the tiger, but with less danger. They often, however, charge and gore the elephant, though generally from the number and noise of the pursuers, fly until closely pressed or enraged by wounds.

In the combats with the tiger, the buffalo is generally the victor. Those chosen for this purpose are males of the domestic breed, trained to the spirit (as it is termed), and selected for their vigour, size, and spirit. The buffalo is remarkable for his courage, and the smallest provocation irritates him; he will even alone sometimes attack a group of elephants. For the spectacle an area of a round or oval form is erected of sufficient height to allow the spectators to look on in safety. Persons unacquainted with the true character of the tiger would expect to see him attack the buffalo as soon as he might enter the area; but no! as soon as the buffalo makes his appearance, the tiger, which, till then, does not perhaps betray any marked apprehension, all at once sinks into the most contemptible despondency. He sneaks under the pallisade, crouching and turning on his back to avoid the buffalo's charge, he tries every device his situation will admit, and often suffers himself to be gored, before he can be induced to stand on the defensive. The buffalo on entering the area smells the tiger, and becomes instantly agitated with eagerness, his eyes sparkle with fury as they quest around for the skulking enemy, which is generally attacked the moment it is distin-

guished. The buffalo, shaking his head and raking the ground for a few seconds with his foot, places himself in the posture of attack, and with his face brought parallel with the surface, his horns pointing forwards, and his tail indicating both his determination and his vigour, rushes forward at full speed."*

For some other large oxen another group has been thought necessary, which will contain the European Bison, that of America, and one or two others, which are rather imperfectly known. They are characterized by the ridge of the spine being elevated, and often clothed with long hair, the legs rather long, and the hair soft and woolly.

* Colonel Williamson, ii. p. 46.

THE AUROCH.

The European Bison, very imperfectly known, is said to inhabit the forests of Russia in Asia, but is also supposed to be thinly scattered in some of the wilder parts of Germany and Poland. It is about six feet high at the shoulder. The fore parts are clothed with woolly hair above a foot in length, grey or whitish. On the legs and under parts it becomes shorter, and is of a blackish-brown colour. The forehead is convex, the horns short and pointed. The number of ribs on each side fourteen. They are said to live in small troops, and to have a groaning voice. It is the Auroch of the Germans.

Dr von Jarocki gave the following account of the Auroch before the Meeting of Naturalists at Hamburgh in 1830: "A remnant of these animals, which appear to have at one period existed in many parts of Europe, is still preserved in a wild state in the forest of Bialowiza in Poland, under the special protection of the Russian Emperor, in which situation the author, who is Professor of Zoology in the University of Warsaw, has had opportunities of observing them, and of collecting various facts respecting their habits and mode of life.

"The wild oxen of the forest of Bialowiza live

in herds, except a few of the older ones, which wander about singly. Though they have never been tamed, they are not so shy but that they may be approached within a moderate distance, when care is taken to advance towards them from the windward side. Each herd keeps constantly to the same district of forest, near to some river or stream, so that each of the twelve foresters, who have charge of the wood, knows the herds that belong to his district. The number of oxen in every herd is ascertained in the beginning of winter, by observing their feet-tracks on the new fallen snow, as they pass between the wood and the store of hay, which forms their winter provender. The whole number, as thus estimated, is at present about 711, of which 48 are calves of last year. The cows scarcely bring forth above once in three years: the calves are produced in May, and are suckled nearly a whole year. They continue to grow for six years, and may live till forty. The Urus feeds on various grasses, and on the leaves and bark of young trees and brushwood, especially the willow, poplar, ash, and birch. In autumn they also browse on heath, and the lichens which cover the bark of trees. The rutting season commences in August, and lasts a fortnight; about which time they are fat and sleek, and unusually sportive. Their most common sport consists in thrusting their horns into the ground, near a young tree, and ploughing round it till they root it up. It is from this circumstance, in the author's opinion, that the horns are al-

most always more or less torn, or otherwise injured at the points. Horses and domestic cattle scent the Urus afar off, and immediately give signs of great dread and aversion."*

Another animal is introduced here by Major Smith, also very imperfectly known, under the name of the Gaur, *Bison Gaurus*. The descriptions nearly all rest on the authority of sportsmen and natives, but they all turn to the evidence of a very large animal, exceeding in size any of the oxen, with longer hair on the fore parts, and of a light or greyish colour. The vicinity of Midnapoor, and the heavy jungles between Romghur and Nagpoor, are given as the districts they frequent.

The best known animal belonging to the group of Bisons, is that we have chosen for our illustration; it is

* Edinburgh Journal of Natural and Geographical Science, vol. iii. p. 105.

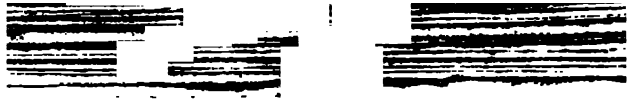
THE AMERICAN BISON.

Bos Americanus.

PLATE XXX.

The Buffalo, *Catesby*, &c.—Bos Americanus, *Gmelin*, *Richardson*.—Bison Americanus, *Griffith's Synopsis.*

Our information regarding this important animal is, thanks to the intrepid travellers in the arctic regions, and particularly to Dr Richardson, much more authentic than most of that we have been able to collect regarding one or two others. We have extracted the most important part of the above-mentioned naturalist's description. They appear to have been formerly found in considerable plenty in Canada, Pennsylvania, and Kentucky, but are gradually receding before the white population; and the rifle, as in southern Africa, has here also done its work. They still exist in the north, and roam in countless herds over the prairies that are watered by the Arkansa, Platte, Missouri, and the upper branches of the Saskatchawan. They reach to latitude 63° and 64°, and are always to be found in the vicinity of the salt-licks, and in another direction extend to New Mexico and California. The Bison is a fierce



THE AMERICAN BISON.

and treacherous-looking animal; and all those which we have seen exhibited under the title of Bonassus, had a most disgusting and sinister look. The head and fore quarter is large, appearing more so by the thick coating of long shaggy hair, covering the head and nape, and almost obscuring the small blood-shot-looking eye. The horns are small, tapering, and acute, set far apart, and nearly straight.

The colour of the animal is a liver or umber-brown, and its height at the shoulder is upwards of six feet. Twelve or fourteen hundred weight is a common weight in the fur countries; but they sometimes reach a weight of 2000 lb. The hump is a mass of fat of various size, according to circumstances, and is much esteemed by epicures. The flesh is juicy and well-flavoured. The skin, from the fine wool, makes an excellent blanket when dressed, and sells in Canada for £3 or £4; and the wool has in this country been manufactured into a fine cloth. Pemmican is made of the flesh and fat of the American Buffalo.

"The Bison wanders constantly from place to place, either from being disturbed by hunters, or in quest of food. They are much attracted by the soft tender grass, which springs up after a fire has spread over the prairie. In winter, they scrape away the snow with their feet, to reach the grass. The bulls and cows live in separate herds for the greater part of the year; but at all seasons one or two old bulls generally accompany a large herd of cows. In the

rutting season, the males fight against each other with great fury, and at that period it is very dangerous to approach them. The Bison is, however, in general a shy animal, and takes to flight immediately on winding an enemy, which the acuteness of its sense of smell enables it to do from a great distance. They are less wary when they are assembled together in numbers, and will often blindly follow their leaders, regardless of or trampling down the hunters posted in their way. It is dangerous for the hunter to shew himself after having wounded one, for it will pursue him, and, although its gait may appear heavy and awkward, it will have no great difficulty in overtaking the fleetest runner. One of the Hudson Bay Company's clerks was descending the Saskatchewan in a boat, and having one evening pitched his tent for the night, he went out in the dusk to look for game. It had become nearly dark when he fired at a Bison bull which was galloping over a small eminence, and as he was hastening forward to see if his shot had taken effect, the wounded beast made a rush at him. He had the presence of mind to seize the animal by the long hair on its forehead, as it struck him on the side with its horns, and being a remarkably tall and powerful man, a struggle ensued, which continued till his wrist was severely sprained, and his arm was rendered powerless. He then fell, and, after receiving two or three blows, became senseless. Shortly after, he was found by his companions lying bathed in blood, being gored

in several places, and the Bison was couched beside him, apparently waiting to renew the attack had he shewn any signs of life.

"The favourite Indian method of killing the Bison is by riding up to the fattest of the herd on horseback, and shooting it with an arrow. When a large party of hunters are engaged in this way on an extensive plain, the spectacle is very imposing, and the young men have many opportunities of displaying their skill and agility."*

The *pound*, as it is termed, is used for taking several kinds of the larger wild animals, and, though differently constructed, according to circumstances, is always made upon the same principle of driving the animals within a toil or enclosure where they cannot escape. That for taking the buffalo has been described by both Captain Hall and Dr Richardson. In North America, in the fur countries, "the Buffalo pound was a fenced circular space of about a hundred yards in diameter; the entrance banked up with snow, to a sufficient height to prevent the retreat of the animals that may once have entered. For about a mile on each side of the road leading to the pound, stakes were driven into the ground at nearly equal distances of about twenty yards. These were intended to look like men, and to deter the animals from attempting to break out on either side. Within fifty or sixty yards from the pound, branches of trees were placed between these stakes, to skreen

* Richardson, p. 232.

the Indians, who lie down behind them to wait the approach of the buffalo. The principal dexterity in this species of chase is shewn by the horsemen, who have to manœuvre round the herd in the plains, so as to urge them to enter the roadway, which is about a quarter of a mile broad. When this has been accomplished, they raise loud shouts, and pressing close upon the animals, to terrify them, that they may rush heedlessly forward towards the snare. When they have advanced as far as the men who are lying in ambush, they also rise, and increase the consternation, by violent shouting and firing guns. The affrighted beasts having no alternative, run directly into the pound, where they are quickly dispatched, either with an arrow or gun."*

Another animal, which will range under this division, is an Indian Ox, which has been figured by Frederic Cuvier, whose plate we have used as the materials for the accompanying illustration.

* Franklin's First Narrative, p. 112.

THE GAYAL or Silhet Cattle.

Fred. Cuvier.

THE SYLHET OX.

Bison Sylhetanus.—F. Cuv.

PLATE XXXI.

Jungly-gau, *F. Cuv. Hist. Naturelle des Mammif.*

This animal was discovered wild in the mountains of Sylhet by M. Alfred Duvancel, and a description and figure remitted to Frederic Cuvier, who has published them in his great work. Both these gentlemen were at first inclined to consider it as one of the states or varieties of the domestic cattle; and the opinion of the former was not changed until he saw it on its native hills. They were as abundant and as extensively spread as the buffalo. They become soon domesticated when taken, and their milk is more abundant, and reckoned better than that of the other. They are hunted like the buffalo upon elephants.

The horns of the Sylhet bull are placed at the edges of the occipital crest, and are directed to the sides. They are compressed at the base, and become smooth as the animal increases in age. The hump on the shoulders is reduced to a slight fatty eminence, which reaches to the middle of the back.

All this part is covered with a greyish woolly hair, longer than on the other parts, and covering also the back of the neck, occiput, and front. The rest of the hair is black, with the exception of the limbs, which are white to the knees. The tail is terminated by a tuft of long strong hairs; and in males of three years old, long black hairs also hang from the lower part of the neck. The cow is smaller in size, with lesser horns; the hair of a duller black, the grey of the hump shading upon the sides, and having the end of the lower lip white. Major Smith seems to think this identical with the Gayal, *B. Gavæus* of India. His figure and description correspond in many parts; they inhabit also the same districts of country, and never willingly descend to the plains; they delight to range in the thickest forests, feed on the tender shoots, and rarely eat the grasses; they also never wallow in the water. They are held in veneration by the Hindoos, and perform a part in their religious ceremonies and offerings.

The Yak of Tartary is the only other animal we have now to represent

THE YAK.

Bison poephagus.—SMITH.

Poephagus of *Elian.*—Bos Grunniens of *Pallas* and *Authors.*—The Yak, *Shaw*, *Zool.* ii. p. 411.—Bison poephagus of *Smith.*

THE Yak inhabits the range of mountains which separates Thibet from Bootan, living in the wooded valleys, and often making excursions to the limits of the snow line; and Majór Smith is inclined to consider the white cattle of the Ramghur as varieties, which would extend the limits that have usually been assigned to it. The Yak is of an elegant form, heavy before, but not so light in the hind quarters as the bisons generally. The size varies, they are sometimes humped, sometimes without it. The general colour is black, or nearly so. The mane, hair on the hump and tail, nearly white, the latter almost always so. The hair on the forehead is frizzled, that on the mane and fore quarters of some length, and that on the hump also long and curled. The tail is always very long, one in the British Museum measuring six feet, and is composed of an immense mass of long, fine, and silky hair. These are in great re-

quest by the rich and luxurious in the east, as fly whippers, and when cut off and dressed, sometimes dyed, are called *chordrees*. "No man of fashion in India ever goes out, or sits in form at home, without two chourabadors or brushers attending him, each furnished with one of these tails, mounted on silver or ivory handles, to brush away the flies. The Chinese dye them of a beautiful red, and wear them as tufts to their summer bonnets."

The Yak is domesticated by the Tartars, and affords them many useful articles, besides their food, and milk as a nourishing drink. Their skins are used as a warm covering, and ropes are made of their hair. They are never used for tillage or as beasts of draught, but for bearing a burden they are much employed, are docile, and extremely sure footed. In their habits they agree with the bisons, and are said to be fond of wallowing, and they appear to enjoy the vicinity of snow.

Mr Swainson's classification of the Ruminating Animals, according to their natural affinities.

The Class Mammalia is divided into Five Orders. *Quadrumana*, or Four-Handed Mammalia. *Feræ*, or Beasts of Prey. *Cetacea*, or Aquatic Mammalia. *Ungulata*, or Hoofed Quadrupeds. *Glires*, or Gnawing Quadrupeds.

The Fourth Order, *Ungulata*, or Hoofed Quadrupeds, is divided into Five Tribes, *Pachydermes*, *Anoplotheres*, *Edentates*, *Ruminantes*, *Solipedes*.

The Fourth Tribe, *Ruminantes*, the Ruminating Quadrupeds, is thus distributed:

1. *Sub-Typical Group.*—Horns sheathing; form gracile, slender. Fam. *Antelopidæ*, Sw.*

Genera, &c.

1. Dicranoceros, Sm.	12. Tragelaphus, Sm.
2. Aigocerus, Sm.	13. Nemorhædus, Sm.
3. Oryx, Sm.	14. Rupicarpa, Sm.
4. Gazella, Sm.	15. Aplocerus, Sm.
5. Antelope, Sm.	16. Capra, Auct.
6. Redunca, SR.	17. Ovis, Auct.
7. Tragulus, Sm.	18. Damalis, Sm.
8. Raphicerus, Sm.	19. Acronatus, Sm.
9. Tetracerus, Leach.	20. Baselaphus, Sm.
10. Cephalophus, Sm.	21. Strepsicerus, Sm.
11. Neotragus, Sm.	22. Portax, Sm.

* This Family is equal to the *Capridæ* of Smith, but is here named from the Antelopes as typical.

2. *Typical Group.*—Horns sheathing; form heavy, robust. —Fam. *Bovidæ*, Smith.

Genera, &c.

1. Catoblepas, Sm.
2. Ovibos, Sm.
3. Bos, Sm.
4. Bubalus, Sm.
5. Bison, Sm.
6. Taurus, Sm.
7. Anoa, * Sm.

3. *Aberrant Group.* —Horns solid, deciduous.— *Cervidæ*, Smith.

Genera, &c.

1. Alce, Sm.
   1. Rangifer, Sm.
   2. Dama, Sm.
2. Cervus, Linn.
   1. Rusa, Sm.
   2. Axis. Sm.
3. Capreolus, Sm.
   1. Mazama, Sm.
2. Subulo, Sm.
5. Stylocerus, Sm.

Horns wanting; fore-legs shorter than the hinder. — *Moschidæ*, Sw.

1. Moschus, Linn.

Horns very short, covered with a skin. — *Cameleopardæ*, Sw.

1. Cameleopardalis, antiq.

At the commencement of the 5th Tribe *Solipedes*, is placed the Camels, &c.

1. Camelus, Linn.
2. Auchenia, Illig.
3. Equus, Antiq.

Thus the Camels and Llamas, with which Major Smith has commenced his Ruminants, are placed here at the conclusion, to represent these animals among the single-hoofed quadrupeds, of which the Horse will be typical, and concluding the great and interesting order of the *Ungulata*.

* This genus is placed by Major Smith among his Capridæ.

HAVING finished our sketch of this important tribe of animals, we would wish to impress upon individuals abroad the imperfect knowledge we yet possess of a very great number of these animals, which seem capable of being applied to so many of the wants of mankind. Many gentlemen follow with great keenness the sports of the field, and undergo great fatigue, and risk much danger; and a little attention at the conclusion of their day's sport, and a little care of some of the animals killed, besides those which are good for the table, would, in time, add to our knowledge, and would greatly increase the pleasure and satisfaction derived from their hunting expeditions. The skins, perhaps, could not always be preserved, but in a warm country, skeletons are easily made, and the skull, with the horns attached, are always of much importance in discriminating a species, and have the farther qualification of not being easily spoiled or destroyed. Native artists, particularly in India, draw with great accuracy; and, next to the animal itself, a correct drawing is of importance. Immense districts of our possessions in every part of the world are yet unexplored; and, wherever man has gained a footing for a short space, the animals are fleeing before him, and none more than the ruminants dislike interruption, and delight in solitude. Our Indian possessions are examples of this, in the extirpation of al

most all the large animals from the cultivated lands; and the colony of the Cape is another, where the herds of antelopes are so fast receding. The registration of a single fact, the putting down of a memorandum of the habits of an animal, or a single measurement, is often thrown aside as insignificant, or it is not made at all (after it has been resolved upon), as being only one; but it may be of very great importance, and may solve some intricate question. A commencement will often carry with it a continuance, and one examination by its interest will beget another; while, in addition, it may be borne in mind, that their endeavours will increase our knowledge of the works of Him by whose power and goodness "*all things were made, and without whom was not any thing made that was made.*"

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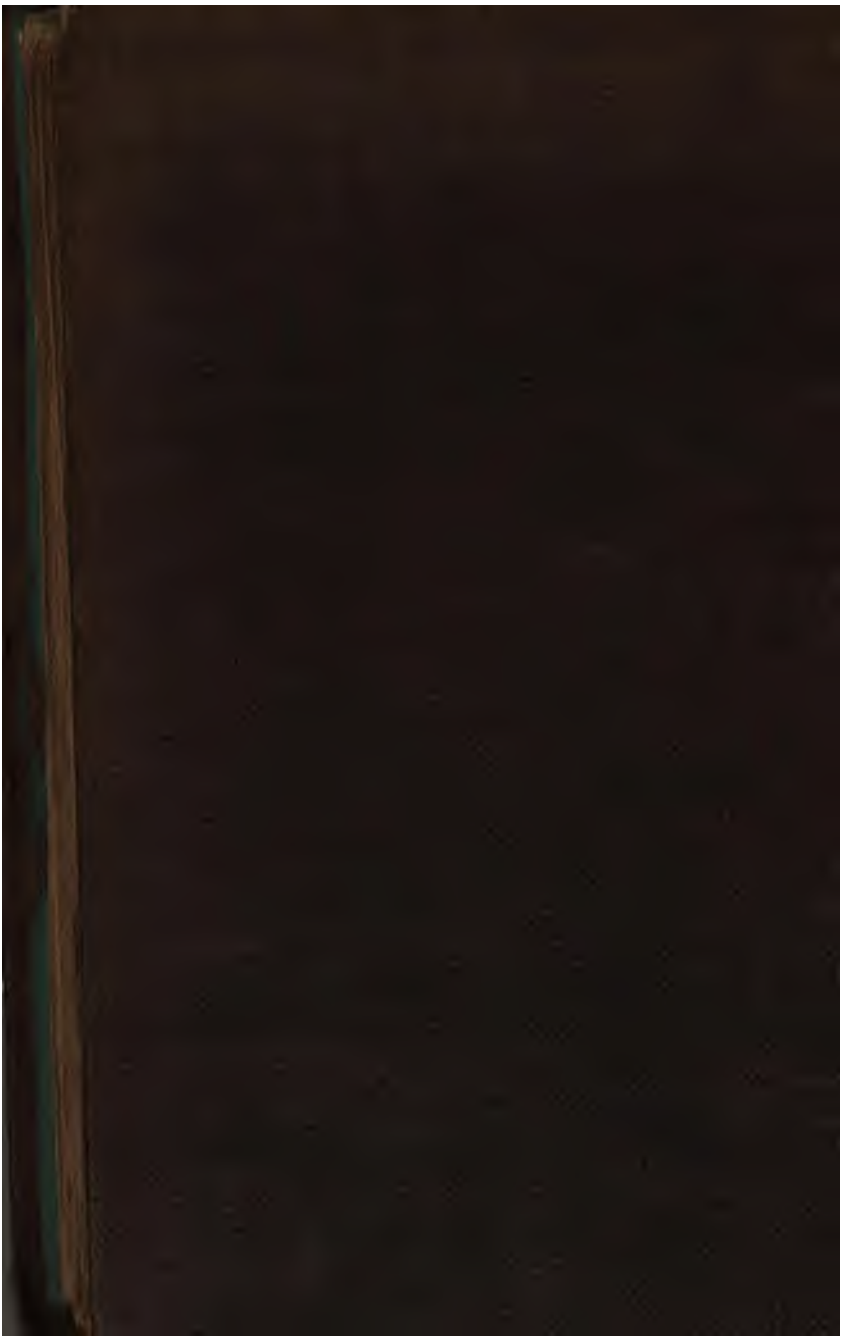
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